

ENVIRONMENTAL ASSESSMENT

Cooperative Gypsy Moth Project For Indiana 2010

By

**Indiana Department of Natural Resources
Division of Entomology & Plant Pathology**

**Indiana Department of Natural Resources
Division of Forestry**

**United States Department of Agriculture
Forest Service**

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1.0 PURPOSE AND NEED FOR ACTION

1.1 Proposed Action

The Indiana Department of Natural Resources (IDNR), Division of Entomology & Plant Pathology and Division of Forestry, proposes a cooperative project with the United States Department of Agriculture (USDA), Forest Service (USFS) to treat the gypsy moth populations at 5 sites in 6 counties that cover an estimated 94,461 acres (Table 1 below and maps in Appendix B). The preferred alternative for the cooperative project is Alternative 5: Btk, mating disruption and/or mass trapping.

Table 1. Number of Treatment Sites and Acres by County and Treatment Method for 2010.

COUNTY	TREATMENT SITES By Treatment Method		TREATMENT ACRES By Treatment Method	
	Mating Disruption	Btk Aerial	Mating Disruption	Btk Aerial
Allen	0	1	0	25,220
Kosciusko	0	1	0	3,459
Huntington/Wabash	1	0	49,322	0
Lake	1	0	11,754	0
Marshall	1	0	4,706	0
Cooperative Project by Treatment	3	2	65,782	28,679
Total Cooperative Project	5		94,461	

1.2 Project Objective

The objective for this cooperative project is to slow the rate of spread of gypsy moth from the proposed treatment sites in Indiana. Over the past 4 years in Indiana, this objective has been successfully met, while implementing the Slow The Spread Program (STS) [see Tobin & Blackburn (2007) and Gypsy Moth Slow The Spread Foundation, Inc., <http://www.gmsts.org>].

1.3 Need for Action

Gypsy moth is not native to the United States, and it lacks effective natural controls. The caterpillars feed on the foliage of many host plants. Oaks are the preferred host species, but the caterpillars defoliate many species of trees and shrubs when oaks are not available. When high numbers of gypsy moth caterpillars are present, forests and trees suffer severe defoliation, which can result in reduced tree growth, branch dieback and even tree mortality. The high numbers of caterpillars also create a substantial public nuisance and can affect human health.

The State of Indiana, with the IDNR, Division of Entomology and Plant Pathology as the lead agency, is dedicated to preserving urban and rural forested habitats from damage by gypsy moth

and to enforcing interstate and intrastate quarantines to further protect areas not currently infested by this pest. If no action is taken, gypsy moth will increase and spread and defoliation will occur sooner. Therefore, the "no action" alternative is not preferred due to state officials desire to eliminate the isolated infestations, prevent human discomfort associated with infestations, delay damage to local plant communities and reduce spread to adjacent non-infested areas. Through public involvement, participating citizens supported the proposed action (Appendix A).

1.4 Decisions to be Made and Responsible Officials

The preferred alternative in this document proposes cooperative participation of the IDNR and the USFS in treatment of gypsy moth populations in Indiana. The decision to be made by the responsible USFS official is to choose which of the alternatives presented in this document best fulfills the objectives of the proposed action, and thus the needs of the people of Indiana. In addition, the decision will have to be made as to whether or not any perceived significant environmental impacts could result from the implementation of this project. If there are none, this will be documented in a Decision Notice and FONSI (Finding of No Significant Impact). If significant environmental impacts are found and the project is to continue, an Environmental Impact Statement (EIS) would be prepared.

The alternatives analyzed for this environmental assessment are: 1) No cooperative project (No action), 2) Btk, 3) Mating disruption, 4) Mass trapping, 5) Btk, mating disruption and mass trapping (Preferred Alternative).

The responsible USFS official who will make this decision is:

Barbara Tormoehlen, Acting Field Representative, USDA, Forest Service, State and Private Forestry, Northeastern Area, 1992 Folwell Avenue, St. Paul, MN 55108, (651)-649-5276.

The responsible officials for the implementation of the cooperative project in the Indiana IDNR are:

Philip Marshall, State Entomologist, Indiana Department of Natural Resources, Division of Entomology and Plant Pathology, 402 West Washington Street, IGC South, Room W290, Indianapolis, IN 46204, (317) 232-4120.

John Seifert, State Forester, Indiana Department of Natural Resources, Division of Forestry, 402 West Washington Street, IGC South, Room W296, Indianapolis, IN 46204, (317) 232-4105.

1.5 Scope of the Analysis

A final environmental impact statement (FEIS), developed by the USDA, Animal & Plant Health Inspection Service (APHIS) and USFS, entitled Gypsy Moth Management in the United States: a cooperative approach (USDA 1995) was made available in November 1995. The Record of Decision for the FEIS was signed in January of 1996 (USDA 1996), and Alternative 6 was selected, which includes all three management strategies analyzed – suppression, eradication, and slow-the-spread. These strategies depend upon the infestation status of the area: generally

infested, uninfested, and transition. Implementation of the FEIS preferred alternative requires that a site-specific environmental analysis be conducted to address local issues before federal or cooperative projects are conducted. This site-specific analysis is tiered to the programmatic environmental impact statement (USDA 1995). As part of the analyses conducted for the FEIS, human health and ecological risk assessments were prepared (Human Health Risk Assessment, Appendix F to the FEIS and Ecological Risk Assessment, Appendix G to the FEIS). The purpose of tiering is to eliminate repetitive discussions of the issues addressed in the FEIS (40 CFR, 1502.20 and 1508.28 in Council on Environmental Quality, 1992).

This environmental assessment provides a site-specific analysis of the alternatives and environmental impacts of treating gypsy moth populations for the Transition Area in Indiana.

1.6 Summary of Public Involvement and Notification

Public meetings were held during January and February of 2010 (Appendix A). A notice of the public meeting was delivered to elected officials, interested groups, residents and local media. At each meeting, state officials presented alternatives for gypsy moth management. The discussion included identification and biology of gypsy moth, pest impacts, survey methods, and control tactics. The proposed actions and alternatives, including no action, were discussed. Local issues, questions and concerns stated at the public meetings and in subsequent phone calls, letters and emails are included in Appendix A.

Information gathered from the public and from resource professionals was used to develop issues and concerns related to the project. They are grouped into two categories; 1) issues used to formulate alternatives, and 2) other issues and concerns.

1.7 Issues Used to Formulate the Alternatives

Each of the major issues is introduced in this section. Discussion pertaining directly to each issue as it relates to the alternatives can be found in Chapter 4.

Issue 1 - Human Health and Safety. Three types of risk are addressed under this issue: 1) an aircraft accident during applications, 2) treatment materials and potential effects on people, and 3) the future effects of gypsy moth infestations on people.

Issue 2 - Effects on Nontarget Organisms and Environmental Quality. The major concerns under this issue are: 1) the impact of treatment materials to nontarget organisms, including threatened and endangered species that may be in the treatment sites, and 2) the future impacts of gypsy moth defoliation on the forest resources, water quality, wildlife and other natural resources.

Issue 3 - Economic and Political Impacts of Treatment vs. Non-Treatment. Gypsy moth outbreaks can have significant economic impacts due to effects on the timber resource, nursery and Christmas tree producers, and recreational activities. An additional economic impact is a gypsy moth quarantine imposed to regulate movement of products from the forest, nursery and recreational industries to uninfested areas.

Issue 4 - Likelihood of Success of the Project. The objective of this project is reducing the spread rate of gypsy moth within Indiana. Alternatives vary in their likelihood of success for the current situation in Indiana. Measurement of project success is important for delaying gypsy moth impacts to Indiana and neighboring states.

1.8 Other Concerns and Questions

Concerns and questions were discussed during the public meetings (see Appendix A). Also, other agencies were consulted (see Appendix C). Information from these sources was used to develop management guidelines, treatment constraints, and mitigating measures.

1.9 Summary of Authorizing Laws and Policies

State. The Division Director (State Entomologist) may cooperate with a person in Indiana to locate, check, or eradicate a pest or pathogen (Indiana Code 14-24-2-1). The Division Director may, on the behalf of the department, enter into a cooperative agreement with the United States government, the government of another state, or an agency of the United States or another state to carry out this article (Indiana Code 14-24-2-2). Aerial applicators must meet Indiana Pesticide Use and Application Law (Indiana Code 15-3-3.6) to provide safe, efficient and acceptable applications of pesticides. The Non-Game and Endangered Species Conservation law (Indiana Code 14-22-34) applies to this project.

Federal. Authorization to conduct treatments for gypsy moth infestations is given in the Plant Protection Act of 2000 (7 U.S.C. section 7701 et.seq.).

The Cooperative Forestry Assistance Act of 1978 provides the authority for the USDA and state cooperation in management of forest insects and diseases. The law recognizes that the nation's capacity to produce renewable forest resources is significantly dependent on non-federal forestland. The 2008 Farm Bill (P.L. 110-246) reauthorizes the basic charter of the Cooperative Forestry Assistance Act of 1978.

The National Environmental Policy Act (NEPA) of 1969 (P.L. 91-190), 42 USC 4321 et. seq. requires a detailed environmental analysis of any proposed federal action that may affect the human environment. The courts regard federally funded state actions as federal actions. The Federal Insecticide, Fungicide and Rodenticide Act of 1947, (7 USC 136) as amended, known as FIFRA, requires insecticides used within the United States be registered by the United States Environmental Protection Agency (EPA).

Section 7 of the Endangered Species Act prohibits federal actions from jeopardizing the continued existence of federally listed threatened or endangered species or adversely affecting critical habitat of such species.

Section 106 of the National Historical Preservation Act and 36 CFR Part 800: Protection of Historic Properties requires the State Historic Preservation Officer be consulted regarding the proposed activities.

USDA Departmental Gypsy Moth Policy (USDA 1990) assigns the USFS and APHIS responsibility to assist states in protecting non-federal lands from gypsy moth damage.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Process Used to Formulate the Alternatives

Staff entomologists and administration within the IDNR, Division of Entomology and Plant Pathology and the Division of Forestry in cooperation with USDA Forest Service, formulated several alternatives to treat the gypsy moth populations in Indiana under the slow-the-spread strategies (See Chapter 6, Persons and Agencies Consulted).

The FEIS (USDA 1995), which this document is tiered to, allows the USDA to participate in the Cooperative Gypsy Moth Project for Indiana. The USDA can assist in conducting eradication, slow-the-spread and suppression strategies. The FEIS lists the treatment options for each of the strategies (USDA 1995, Vol. II, p.2-15). For the slow-the-spread strategy, the following six treatment options may be considered: 1) *Bacillus thuringiensis* var. *kurstaki* (Btk), 2) diflubenzuron (Dimilin), 3) nucleopolyhedrosis virus (Gypchek), 4) mass trapping, 5) mating disruption, and 6) sterile insect release. These treatment options from the FEIS were used as the alternatives for the site-specific analysis of this Environmental Assessment.

2.2 Alternatives Eliminated from Detailed Study

The following alternatives that are available were eliminated from consideration:

Diflubenzuron (Dimilin). The label for diflubenzuron (Dimilin) prohibits its use over wetlands and directly to water. Many treatment sites contain ponds, lakes, marsh, rivers and/or wetlands. Therefore, its use was not considered for this project. This does not preclude the consideration and use of Dimilin in future projects.

Gypsy moth specific nucleopolyhedrosis virus (Gypchek). Gypsy moth nucleopolyhedrosis virus (Gypchek) has a very limited supply and is targeted for use in special areas that have high environmental concerns (e.g., treatment sites that have threatened or endangered species, which could be impacted by other treatment options). There are limited data on the effectiveness of Gypchek in low-level gypsy moth populations. It is preferably used in suppression projects against moderate to high gypsy moth populations (USDA 1995, Vol. II, p. A7). Therefore, NPV is not considered for this project. In future projects, it will be evaluated for use.

Sterile insect release. The FEIS documents the use of sterile insects for elimination of isolated gypsy moth populations. It also documents the obstacles of using this alternative - the limited release period; need to synchronize production of sterile pupae and release into the population; and the limited availability. This treatment alternative is currently not available, and it has not been used in recent eradication or slow-the-spread treatment projects. Giving consideration to these obstacles, this alternative was not considered for this project. In future projects, it will be evaluated for use.

2.3 Alternatives Considered in Detail

Alternative 1 - No action. If no action is taken, the gypsy moth will reproduce and populations will begin to defoliate trees in the area. Gypsy moth populations will develop and spread to surrounding areas. This is not a preferred alternative because damage and regulatory action will occur sooner than if other alternatives are selected.

Alternative 2 - Btk. This treatment option uses one or two applications of Btk at 24 to 38 billion international units (BIU) per acre applied from air or ground. The applications would begin when leaf expansion is near 50% and when first and second instar caterpillars are present and feeding. This usually occurs between late April and late May in northern Indiana. The second application would follow no sooner than four days after the first application. Most commercial formulations of Btk are aqueous flowable suspension containing 48 or 76 BIU/gal. (Appendix D – example of product label). For aerial application at 24 to 38 BIU, less than 3.0 quarts of the product would be applied per acre.

Btk has been a commonly used treatment option in Cooperative Gypsy Moth Projects in Indiana and other states. Btk is a naturally occurring soil-borne bacterium that is mass-produced and formulated into a commercial insecticide. The Btk strain is effective against caterpillars, including the gypsy moth caterpillar. Caterpillars ingest Btk while eating the foliage. Once in the midgut, Btk becomes active and causes death within a few hours or days (USDA 1995, Vol. II, p. A3-A5). Btk may impact nontarget species of spring-feeding caterpillars in the treatment sites, but the impact to the local population is usually very minimal as Btk rapidly degrades on the foliage within a few weeks, and the nontarget lepidopterans generally re-colonize treatment sites in less than 2 years (USDA 1995, Vol. II, p. 4-52 to 4-55). Human exposure to Btk provides little cause for concern, though direct exposure to the spray may cause temporary eye and respiratory tract irritation in a few people (USDA 1995, Vol. II, p. 4-13).

Btk has proven effective at eliminating or reducing gypsy moth at all levels of population. Thus, Btk applications can meet the project objective of slowing the rate of spread of gypsy moth at all of the proposed treatment sites.

Alternative 3 - Mating disruption. This treatment option uses one aerial application of pheromone flakes or SPLAT (Specialized Pheromone and Lure Application Technology) with the active ingredient, disparlure, prior to the emergence of male moths. This would occur in mid-June to early July. Mating disruption relies on the attractive characteristics of disparlure, the gypsy moth sex pheromone. The objective of mating disruption is to saturate the treatment area with enough pheromone sources to confuse the male moths and prevent them from finding and mating with female moths. Mating disruption is considered specific to gypsy moth and is not known to cause impacts to nontarget organism populations, water quality, microclimate, or soil productivity and fertility (USDA 1995, Vol. II, p. 4-67).

Mating disruption using pheromone flakes involves the aerial application of plastic flake dispensers that are impregnated with the gypsy moth pheromone. The formulation of Disrupt II (see Appendix D – example of product labels) consists of small plastic flakes, approximately 1/32 inch x 3/32 inch (1 x 3 mm) in size, thus the name “pheromone flakes”. A sticker,

Monsanto's Gelva 2333, is applied to the flakes as they are dispersed from the aircraft, which aids in the distribution of the flakes throughout all levels in the forest canopy where mating could potentially occur. The flakes are green in color and applied at a rate of 6 or 15 grams active ingredient (disparlure) per acre. At the high rate of 15 grams, 85 grams of flakes are applied in 2 fluid ounces of sticker per acre (2 flakes per sq.ft.) (Thorpe et al. 2006). All of the ingredients in the Gelva 2333 sticker are considered non-hazardous to public health if used as an additive in the insecticide formulation (40 CFR 180.1001).

Mating disruption using SPLAT involves the aerial application of amorphous polymer matrix droplets that are infused with the gypsy moth pheromone. The formulation of SPLAT consists of small waxy droplets, approximately 0.3 mm to 2.0 mm in size when released from a conventional aerial application system. The droplets are a grayish white in color and applied at a rate of 3 grams to 30 grams of active ingredient (disparlure) per acre (see Appendix D – example of product labels). Applications would most commonly be applied at a rate of either 6 or 15 grams of pheromone per acre. All of the matrix ingredients are cleared as food safe by the FDA and biodegradable.

Mating disruption has proven effective at eliminating or reducing gypsy moth at very low population levels and can meet the project objective of slowing the rate of spread of gypsy moth at three of the proposed treatment sites.

Alternative 4 - Mass trapping. This treatment option places gypsy moth traps at a close spacing within the treatment sites. “The objective of this treatment is to capture male gypsy moths before they have a chance to locate and mate with female moths” (USDA 1995, Vol. II, p. A-7). “For mass trapping, delta or milk carton traps are deployed in an intensive grid pattern in an infested area and an adjacent buffer area at the rate of at least 9 traps per acre” (USDA 1995, Vol. II, p. A-8). Thus, it is very labor intensive, especially over large areas. Typically, mass trapping is used on small infestations of less than 40 acres.

Mass trapping has proven capable of eliminating or reducing gypsy moth at very low population levels in isolated introductions. The use of mass trapping can meet the project objective of slowing the spread of gypsy moth at three of the proposed treatment sites.

Alternative 5 - Btk, Mating disruption and Mass trapping (Preferred Alternative). The use of this alternative provides flexibility to select Btk, mating disruption, or mass trapping alone or in combination for each site based on the following criteria: 1) gypsy moth population level, 2) habitat type (urban, rural, open water or wetland), 3) nontarget organisms, 4) safety and 5) cost and project efficiency. The use of this alternative can meet the objective of slowing the spread of gypsy moth at all of the proposed treatment sites.

2.4 Comparative Summary of Alternatives

Table 2. Summary of Environmental Consequences for Alternatives by Issues from Chapter 4.

	Issue 1 Human Health & Safety (pgs. 14-15)	Issue 2 Effects on Nontarget Organisms & Environmental Quality (pgs. 15-17)	Issue 3 Economic and Political Impacts (pgs. 17-18)	Issue 4 Likelihood of Success of the Project (page 18)
Alternative 1 No action	<ul style="list-style-type: none"> - No risk of an aircraft accident or spill. - No risk of Btk contact with humans. - Gypsy moth outbreaks will occur sooner with the associated nuisance and health impacts to humans. 	<ul style="list-style-type: none"> - No direct effect to nontarget organisms, including threatened and endangered species. - Future gypsy moth impacts will occur sooner, which includes defoliation and reduction in the oak component of forest stands. 	<ul style="list-style-type: none"> - Regulatory action would occur sooner. - Spread of gypsy moth through these counties and into adjacent counties would not be slowed. - Suppression projects and negative financial impacts from defoliation would occur sooner. 	<ul style="list-style-type: none"> - The spread of gypsy moth would not be slowed at the treatment sites and the project objective would not be met.
Alternative 2 Btk	<ul style="list-style-type: none"> - Slight risk of aircraft accident and pesticide spill. - Contact with Btk may cause mild and temporary irritation (eye, skin & respiratory) to a few people. - Delay effect of gypsy moth outbreaks on humans. 	<ul style="list-style-type: none"> - Direct impact on spring feeding caterpillars, temporary reduction in local populations. - Unlikely effect on Karner blue butterfly and Mitchell's satyr as neither species is known to occur within or adjacent to treatment sites. - Adverse effect on Indiana bat, clubshell mussel and copperbelly water snake is unlikely. - Delay the impact of gypsy moth defoliation on environmental quality. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in these counties during the current year. - Slows the spread of gypsy moth. 	<ul style="list-style-type: none"> - Success is likely in the treatment sites.
Alternative 3 Mating disruption	<ul style="list-style-type: none"> - Slight risk of aircraft accident. - No effect to human health. - Delay effect of gypsy moth outbreaks on humans. 	<ul style="list-style-type: none"> - No effect to nontarget organisms, including threatened and endangered species known to occur within the site. - Delay the impact of gypsy moth defoliation on environmental quality. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in these counties during the current year. - Slows the spread of gypsy moth. 	<ul style="list-style-type: none"> - Success is likely in the treatment sites with very low populations.
Alternative 4 Mass trapping	<ul style="list-style-type: none"> - No risk of aircraft accident or spill. - No risk of Btk contact with humans - No effect to human health - Delay effects of gypsy moth outbreaks on humans. 	<ul style="list-style-type: none"> - No effect to nontarget organism including, threatened and endangered species known to occur within the site. - Delay the impact of gypsy moth defoliation on environmental quality. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in these counties during the current year. - Slows the spread of gypsy moth. - Cost is prohibitive in large treatment sites. 	<ul style="list-style-type: none"> - Success is likely in treatment sites of <40 acres with very low populations.
Alternative 5 Btk, Mating disruption and mass trapping	<ul style="list-style-type: none"> - Same as alternative 2, 3 or 4 depending on the treatment at each site. 	<ul style="list-style-type: none"> - Same as alternative 2, 3 or 4 depending on the treatment at each site. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in these counties during the current year. - Slows the spread of gypsy moth. 	<ul style="list-style-type: none"> - Success is likely in the treatment sites.

3.0 AFFECTED ENVIRONMENT

3.1 Description of the Proposed Treatment Sites

Allen County: There are approximately 432,635 acres in Allen County and 59,276 acres of forest that contain both favorable and unfavorable host species. Of the 25,220 total acres of assessed land area for this proposed treatment site, only forested habitat will be treated. This is a small portion of the total forested acres in this county.

Aboite 1-7: The proposed treatment site contains 25,220 acres. The site is composed of trees associated with both rural and urban residences and woodlots. Oak, hickory, beech, basswood, maple, cherry, ash, cottonwood, elm, crabapple, spruce, pine, hemlock, walnut, locust, hackberry, bald cypress, and other hardwoods and shrubs are present. Houses, schools, businesses and churches occur within the site. An environmental study area for Southwest Allen County Schools, Sycamore Hills Golf Club, several parks, Fort Wayne Country Club, Eagle Marsh Preserve, Lindenwood Cemetery, and Lindenwood Nature Preserve occur within the site. St. Mary's River and several creeks and ponds occur within the site. Several power lines, a water tower, several communication towers, stadium lights, tall buildings occur within the site. Lutheran Hospital has a helipad, and occurs within the site. The site was detected in 2008 and delimited in 2009. Several egg masses were detected in this site in 2009. Survey indicates a low gypsy moth population, and Btk is proposed for this site.

Kosciusko County: There are approximately 384,800 acres in Kosciusko County and 42,000 acres of forest that contain both favorable and unfavorable host species. Of the 3,459 total acres of assessed land area for this proposed treatment site, only forested habitat will be treated. This is a small portion of the total forested acres in this county.

Leesburg 1-8: The proposed treatment site contains 3,459 acres. The site is composed of trees associated with both rural and urban residences and woodlots. Elm, oak, ash, walnut, cherry, spruce, white pine, and other hardwoods and shrubs are present. Houses occur within the site. A private classified forest/nature preserve occurs within the site. Several scattered small wetlands area and private ponds occur within the site. No towers or power lines have been identified within the site. Warsaw Airport is just to the southeast of the treatment site. Berkey Field Airport (which appears to be inactive and for sale) is approximately a half mile to the west of the treatment site. Kosciusko Community Hospital Heliport is approximately 3.5 miles southeast of the treatment site. The site was detected in 2009 and has had no prior treatment. Egg masses were detected in this site in 2009. Survey indicates a low gypsy moth population, and Btk is proposed for this site.

Huntington/Wabash County: There are approximately 244,898 acres in Huntington County and 6,490 acres of forest that contain both favorable and unfavorable host species. There are approximately 263,868 acres in Wabash County and 10,060 acres of forest that contain both favorable and unfavorable host species. Of the 49,322 total acres of assessed land area for this

proposed treatment site, only forested habitat will be treated. This is a small portion of the total forested acres in this county.

Lagro 1-5: The proposed treatment site contains 49,322 acres. The site is composed of trees associated with rural residences and woodlots. Oak, hickory, maple, cherry, cottonwood, sycamore, walnut, spruce, pine, beech, and other hardwoods and shrubs are present. Houses, schools and businesses (including LaFontaine Golf Course) occur within the site. Salamonie State Forest and Kokiwanee Nature Preserve occur within the site. Salamonie River, Wabash River, Salamonie Reservoir Dam and several creeks and ponds occur within the site. Several communication towers, power lines and a water tower occur within the site. The site was detected in 2009 and has had no prior treatment. No egg masses were detected in this site in 2009. Survey indicates a very low gypsy moth population, and mating disruption is proposed for this site.

Lake County: There are approximately 316,431 acres in Lake County and 18,877 acres of forest that contain both favorable and unfavorable host species. Of the 11,754 total acres of assessed land area for this proposed treatment site, only forested habitat will be treated. This is a small portion of the total forested acres in this county.

Hobart 1-4: The proposed treatment site contains 11,754 acres. The site is composed of trees associated with both rural and urban residences and woodlots. Oak, maple, and other hardwoods and shrubs are present. Houses, schools, businesses, a public pool and churches occur within the site. Duck Creek Golf Course, Warren McAfee Park and St. Mary's Medical Center (which has a ground helipad next to the hospital) occur within the site. Two parks and Cressmour Prairie Nature Preserve occur within the site. Lake George, Deep River and several creeks and ponds occur within the site. Cell towers, a water tower and power lines occur within the site. The site was detected in 2009 and has had no prior treatment. One egg mass was detected in this site in 2009. Survey indicates a very low gypsy moth population, and mating disruption is proposed for this site.

Marshall County: There are approximately 288,000 acres in Marshall County and 32,200 acres of forest that contain both favorable and unfavorable host species. Of the 4,706 total acres of assessed land area for this proposed treatment site, only forested habitat will be treated. This is a small portion of the total forested acres in this county.

Tippecanoe 2010: The proposed treatment site contains 4,706 acres. The site is composed of trees associated with rural residences and woodlots. Maple, oak, cherry, ash, sycamore, crabapple, and other hardwoods and shrubs are present. A Christmas tree farm, houses, businesses and churches occur within the site. two wetland areas occur within the site. The Tippecanoe River runs through the west area of the site. No towers or power lines have been identified within the site. Mentone Airport (privately owned) is approximately 5 miles south/southeast of the site. Scott Field (private grass strip) is approximately 5 miles northwest of the site. The site was detected in 2009 and has had no prior treatment. No egg masses were detected in this site in 2009. Survey indicates a very low gypsy moth population, and mating disruption is proposed for this site.

3.2 Threatened and Endangered Species

Consultation with the staff of the U.S. Fish and Wildlife Service determined that, “One of the proposed treatment methods, spraying with *Bacillus thuringiensis* (Btk), is of concern for 2 federally endangered species of Lepidoptera in Indiana, the Karner blue butterfly (*Lycaeides melissa samuelis*) and Mitchell’s satyr butterfly (*Neonympha mitchellii*). The known occurrences of these 2 endangered species are in the northern portions of Lake and Porter Counties (Karner blue butterfly), and isolated locations in LaPorte and LaGrange Counties (Mitchell’s satyr).” “Neither species is known to occur near any of the Btk treatment sites identified in your letter. Treatment with Disrupt II pheromone flakes, (which will occur in Lake and Porter Counties) is considered to be highly specific for gypsy moths, and is not known to have adverse impacts on the federally listed butterflies.”(Appendix C – Letter from U.S. Fish & Wildlife Service).

“One Btk treatment site in Lake County (Hobart BT block – 889 acres) is within 5 miles of the Karner blue butterfly area and is in the vicinity of several State nature preserves that may support state-endangered or rare butterflies. To avoid any potential for adverse impacts to rare butterflies we recommend that aerial treatment in this area be limited to the Disrupt II flakes. However, if aerial treatment is implemented when the wind is not blowing toward the Karner blue butterfly area (northward), we concur that the project is not likely to adversely affect this species.”(Appendix C – Letter from U.S. Fish & Wildlife Service).

“The proposed treatment sites are within the range of the federally endangered Indiana bat (*Myotis sodalis*) (entire state), and the clubshell mussel (*Pleurobema clava*) (Kosciusko County), and the federally threatened copperbelly water snake (*Nerodia erythrogaster neglecta*) (Kosciusko County). In Kosciusko County the clubshell is found only in the Tippecanoe River and the copperbelly water snake records are from wetlands associated with natural lakes which are not near the treatment areas. The proposed Btk treatment in Kosciusko County includes a reach of the Tippecanoe River, however we have no information to indicate that Btk causes adverse affects on mussels or reptiles.”(Appendix C – Letter from U.S. Fish & Wildlife Service).

“None of the proposed treatment areas are near Indiana bat hibernacula, and there are no summer records of Indiana bats near any of the Btk sites (the closest record is approximately 6 miles from the Kosciusko County site). We estimate that the 2010 Btk aerial treatment sites could cover up to 600-700 acres of good quality Indiana bat summer habitat in Kosciusko County (including the Tippecanoe River, extensive bottomland forest and wetlands), and up to 3000 acres of moderate/good summer habitat in Allen County (a combination of riparian, wetland and upland forest, much of which is surrounded by suburban development).” (Appendix C – Letter from U.S. Fish & Wildlife Service).

“The threshold and extent of adverse effects of a loss of lepidopteran forage base on Indiana bats is uncertain, therefore at this time we consider the likelihood of take from the 2010 program to be discountably small. However, to minimize impacts on foraging Indiana bats we recommend that aerial spraying at those 2 sites listed be conducted as early as possible in the season, avoiding large blocks of forest wherever possible.”(Appendix C – Letter from U.S. Fish & Wildlife Service).

“The FWS concludes that the federally assisted 2010 gypsy moth program is not likely to adversely affect any of these federally listed species.”(Appendix C – Letter from U.S. Fish & Wildlife Service).

The IDNR, Environmental Unit reviewed the project and determined, “At this time, no harm to state or federal listed species resulting from the proposed control measures is known or anticipated. The potential harm from the project is less than the potential harm to these same species from an uncontrolled gypsy moth infestation. Time the application of Btk to maximize its effects on gypsy moth caterpillars.”(Appendix C – IDNR, Early Coordination/Environmental Assessment).

3.3 Protection of Historic Properties

The State Historic Preservation Officer did not identify any historic properties that will be altered, demolished, or removed by the proposed project pursuant to Indiana Code 14-21-1-18. (Appendix C –Letter from IDNR, Division of Historic Preservation and Archaeology).

4.0 ENVIRONMENTAL CONSEQUENCES

This section is the scientific and analytic basis for the comparison of alternatives. It describes the probable consequences (effects) of each alternative for each issue. Environmental consequences are summarized in Table 2 for each combination of the alternatives and issues.

4.1 Human Health and Safety (Issue 1).

Alternative 1 – No action. For this alternative, there would be no cooperative project, therefore risk of human contact with mating disruption or Btk and an aircraft accident during application would not exist. However, future impacts by gypsy moth to human health will occur sooner under Alternative 1 than if treatments are used to slow-the-spread of these gypsy moth populations. Gypsy moth outbreaks have been associated with adverse human health effects, including skin lesions, eye irritation, and respiratory reactions. Gypsy moth caterpillars can become a serious nuisance that can cause psychological stress in some individuals (USDA 1995, Vol. II, p. 4-9).

Alternative 2 - Btk. Human exposure to Btk provides little cause for concern about health effects. “On the basis of both the available epidemiology studies as well as the long history of use, no hazard has been identified for members of the general public exposed to Btk formulations” (USDA 1995, Vol. III, p. 4-15). Exposure to Btk may result in temporary eye, skin, and respiratory tract irritation in a few people. A detailed analysis of the risks posed to humans by Btk was conducted for the FEIS -- Human Health Risk Assessment (USDA 1995, Vol. III). Glare and O’Callaghan provide a comprehensive review of *Bacillus thuringiensis*, including Btk. They conclude with this statement, “After covering this vast amount of literature, our view is a qualified verdict of safe to use.” (Glare and O’Callaghan, 2000)

A slight risk of an accident always exists when conducting aerial applications – Btk uses one or two applications. To further reduce this risk, a detailed work and safety plan is required prior to program implementation, which outlines guidelines for aircraft inspections, Btk loading, and conditions for safe applications.

The effect of gypsy moth outbreaks on humans would be delayed using this alternative.

Alternative 3 – Mating disruption. The toxicity of insect pheromones to mammals is relatively low and their activity is target-specific. Therefore the EPA requires less rigorous testing of these products than of conventional insecticides. Risk to human health due to exposure to disparlure, the active ingredient used in mating disruption applications, is discussed in the FEIS (USDA 1995, Vol. II, pp. 4-30 to 4-32). Once absorbed through direct contact, disparlure is very persistent in humans, and individuals exposed to disparlure may attract adult male moths for prolonged periods of time. This persistence is viewed as a nuisance and not a health risk (USDA 1995, Vol. III, 8-1). In acute toxicity tests, disparlure was not toxic to mammals, birds, or fish (USDA 1995, Vol. IV, 5-5) therefore no effects to human health are anticipated.

A slight risk of an accident always exists when conducting aerial applications – mating disruption uses one application. To further reduce this risk, a detailed work and safety plan is

required prior to program implementation, which outlines guidelines for aircraft inspections, product loading, and conditions for safe applications.

The effect of gypsy moth outbreaks on humans would be delayed using this alternative.

Alternative 4 – Mass trapping. The effect of gypsy moth outbreaks on humans would be delayed using this alternative. The human health effects are not anticipated from the use of disparlure in the delta traps (see Alternative 3 above).

Alternative 5 – Btk, Mating disruption, and Mass trapping. The human health and safety consequences stated above for Alternatives 2, 3 and 4 apply to this alternative.

4.2 Effects on Nontarget Organisms and Environmental Quality (Issue 2).

Alternative 1 – No action. With no treatments in the current year, future impacts by the gypsy moth would occur sooner. Defoliation by the gypsy moth will cause selective mortality of preferred host trees. During outbreaks, forest ecosystems can change due to a reduction of the oak component and an increase of tree species that are less desired by gypsy moth, such as maple and ash. Oak forests would likely consist of a more mixed composition in the future; though oak would still be a component.

Gypsy moth defoliation and subsequent tree mortality can affect nontarget organisms by dramatically changing habitats on a local scale. Heavy defoliation can remove food for other leaf-feeding species, including other caterpillars. However, it can also create new habitat for some species by creating snags and increasing understory plant development by increasing light penetration into defoliated areas. Impacts on a larger scale (national, regional, or state) are subtle, gradual, and may be noticeable only after many years or decades (USDA 1995, Vol. II, p. 4-74). Short- and long-term changes in nontarget species have been shown for moderate and heavy defoliation (USDA 1995, Vol. II, p. 4-47 and 4-50). An Ecological Risk Assessment (USDA 1995, Vol. IV) examined gypsy moth impacts on a wide variety of species (mammals, birds, reptiles, amphibians, fish, insects, mollusks, crustaceans, and other invertebrates). Further discussion of gypsy moth and its impact on forest conditions can be found in the FEIS (USDA 1995, Vol. II, p. 4- 41 and 4-74).

Alternative 2 - Btk. Btk can have direct and indirect effects on nontarget organisms. Direct toxicity of Btk is generally limited to the larval stage of moth and butterfly species. Btk is not toxic to vertebrates, honeybees, parasitic and predatory insects, and most aquatic invertebrates (USDA 1995, Vol. IV, p. 5-1). Btk has a direct adverse effect on caterpillars of moths and butterflies, but susceptibility varies widely among species. Btk, as used in gypsy moth projects, poses a risk to some spring-feeding caterpillars; however, permanent changes in their populations do not appear likely. An exception may occur in certain habitats that support small isolated populations of a particular species of moth or butterfly that is highly susceptible to Btk (USDA 1995, Vol. II, p. 4-54). “The U.S. Fish and Wildlife Service identified two federally endangered butterflies - Karner blue butterfly (*Lycaeides melissa samuelis*) and the Mitchell’s satyr butterfly (*Neonympha mitchelii*). These species are not known to occur within or near to

the sites proposed for treatment using Btk.” (Appendix C – Letter from U.S. Fish & Wildlife Service).

Btk may have an indirect effect on other organisms by a reduction in their food resource (e.g. caterpillars, pupae, or adult moths and butterflies). Any effects on vertebrates due to reduction in food availability are probably subtle, especially for mammals and birds that are very mobile. Populations of some gypsy moth parasites and some general lepidopteran parasites may be reduced, due to the reduction in number of potential hosts caused by the Btk spray (USDA 1995, Vol. IV, p. 5-7). The U.S. Fish and Wildlife letter identified that the treatment sites are within the range of the federally endangered Indiana bat (*Myotis sodalis*). “None of the proposed treatment areas are near Indiana bat hibernacula, and there are no summer records of Indiana bats near enough any of the Btk sites (the closest record is approximately 6 miles from the Kosciusko County site).” “The threshold and extent of adverse effects of a loss of lepidopteran forage base on Indiana bats is uncertain, therefore at this time we consider the likelihood of take from the 2010 program to be discountably small. However, to minimize impacts on foraging Indiana bats we recommend that aerial spraying at those 2 sites listed be conducted as early as possible in the season, avoiding large blocks of forest wherever possible.” Thus, the U.S. Fish & Wildlife Service concludes that the federally assisted 2010 gypsy moth program is not likely to adversely affect the Indiana bats. (Appendix C – Letter from U.S. Fish & Wildlife Service).

Applications of Btk formulations do not increase levels of Btk in soil, and Btk persists for a relatively short time in the environment. Changes in soil productivity and fertility are not likely in the treatment sites, because Btk occurs naturally in soils worldwide. Additional information concerning the effects to soil can be found in Appendix G of the FEIS (USDA 1995, Vol. IV).

Application of Btk is likely to maintain the forest condition in the short-term by eliminating or reducing gypsy moth populations in the treatment sites, thus delaying gypsy moth from expanding and causing defoliation. In the long-term, gypsy moth will become well established in these counties; even if this alternative is implemented.

Alternative 3 – Mating disruption. The pheromone, disparlure, is highly specific to gypsy moth, and it will not affect other insects, including any threatened and endangered species of butterflies or moths.

A quantitative assessment of risk from mating disruption was not conducted for the FEIS because of disparlure’s low toxicity to vertebrates and specificity to gypsy moth. As used in mating disruption, disparlure is not likely to impact nontarget organisms (USDA 1995, Vol. II, p. 4-67). The toxicity of insect pheromones to mammals is relatively low. In acute toxicity tests, disparlure was not toxic to mammals, birds, or fish (USDA 1995, Vol. IV, 5-5). At normal application rates, concentration of the pheromone (disparlure) in the mating disruption products remains active for the season. Therefore, no effects on nontarget organisms are anticipated from the proposed mating disruption application.

Using mating disruption is likely to maintain the forest condition in the short-term by eliminating or reducing gypsy moth populations in the treatment sites, thus delaying gypsy moth from

expanding and causing defoliation. In the long-term, gypsy moth will become well established in these counties; even if this alternative is implemented.

Alternative 4 - Mass trapping. The pheromone in the delta trap is highly specific to gypsy moth and will not have an effect on other insects or threatened and endangered species of butterflies or moths. “Mass trapping does not affect nontarget organisms, except those (primarily flying insects) that accidentally find their way into the trap.” (USDA 1995, Vol. II, p. A-9).

Mass trapping is likely to maintain the forest condition in the short-term by eliminating or reducing gypsy moth populations in the treatment sites, thus delaying gypsy moth from expanding and causing defoliation. In the long-term, gypsy moth will become well established in these counties; even if this alternative is implemented.

Alternative 5 - Btk, Mating disruption, and Mass trapping. The nontarget and environmental consequences stated above for Alternatives 2, 3 and 4 apply to this alternative.

4.3 Economic and Political Impacts of Treatment vs. Non-Treatment (Issue 3).

Alternative 1 – No action. If no treatments were applied, the likely action would be to implement a quarantine in these counties during the next year. A quarantine would regulate movement of firewood, logs, other timber products, mobile homes, recreational vehicles, trees, shrubs, Christmas trees, and outdoor household articles. This would create a financial impact to industries that deal with these products.

If current populations are not treated, they will continue to reproduce and grow in size. Defoliation would become noticeable in the future, but it would be difficult to predict exactly when noticeable defoliation would occur. Requests for federal assistance to suppress gypsy moth would be likely when defoliation occurs. Suppression projects are generally more expensive in total dollars than eradication projects because much larger areas are treated. The economic impact to state budgets would increase, as responsible agencies would need to administer and fund these suppression projects.

Following defoliation, negative financial impacts are likely to occur for recreational industries such as resorts and campgrounds. Homeowners, private woodland owners, and forest-based industries could be impacted by gypsy moth treatment costs, tree mortality, and adverse human health effects.

Alternative 4 – Mass trapping. If treatments are applied, regulatory action is not likely for these counties during the next year and the impacts listed under Alternative 1 would be delayed. Mass trapping is typically used in small areas (less than 40 acres) because it is labor intensive (USDA 1995, Vol. II, p. A8-9). Its use for all treatment sites would be cost prohibitive.

Alternatives 2 (Btk), 3 (Mating disruption) and 5 (Btk, Mating disruption, and Mass trapping). If treatments are applied, regulatory action is not likely for these counties during the next year and the impacts listed under Alternative 1 would be delayed.

Economic analysis from the Slow-The-Spread Program (STS) demonstrated the use of Btk, mating disruption and other STS technology reduced the spread of gypsy moth by as much as 60 percent (Sharov et al. 2002, p. 32). The Eastern Plant Board recognized that the benefit of delaying gypsy moth resulted in an economic benefit of \$22.00 for each dollar invested in treatment cost and that the STS Program protected timber, recreation, and private property values (Eastern Plant Board 1997).

4.4 Likelihood of Success of the Project (Issue 4).

Alternative 1 – No action. Project objectives would not be met with this alternative. Gypsy moth would not be eliminated at any level from the treatment sites, and its population would serve as a source for increased spread within the counties and into surrounding counties. If these populations were allowed to increase and expand, gypsy moth could spread through the state in 10 years (Sharov et al. 2002).

Alternative 2 - Btk. Project success is likely with this alternative. Btk is effective in eliminating or reducing gypsy moth in the treatment sites with low gypsy moth populations.

Alternative 3 – Mating disruption. Project success is likely with this alternative in three sites. However, most sites have gypsy moth populations above the recommended level for treatment with mating disruption.

Alternative 4 – Mass trapping. Mass trapping is a labor-intensive treatment and sites greater than 40 acres are usually not mass trapped. It would not be feasible to mass trap all treatment sites.

Alternative 5 - Btk, Mating disruption, and Mass trapping. Project success is optimized with this alternative when treatment selection criteria are used to determine the use of Btk, mating disruption or mass trapping alone or in combination for each site. Over the past 4 years, the leading edge of gypsy moth populations (as defined by the 10-moth line) has been only slightly short of the suggested goal of 4.8 miles/year in Indiana while implementing the Slow The Spread Program (STS). From the data analysis by the STS Program, the average rate of spread in Indiana during 2006-2009 was calculated to be 5.02 miles per year. Treatment selection criteria used to evaluate each site are: 1) gypsy moth population level, 2) habitat type (urban, rural, open water or wetland), 3) nontarget organisms, 4) safety, and 5) cost and project efficiency.

4.5 Unavoidable Adverse Effects

No unavoidable adverse effects were identified for the proposed project.

4.6 Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of resources results in the permanent loss of: 1) nonrenewable resources, such as minerals or cultural resources; 2) resources that are renewable only over long periods of time, such as soil productivity; or 3) a species (extinction) (USDA 1995, Vol. II, p.

4-93). Except for Alternative 1, there is an irreversible commitment of labor, fossil fuel, and money spent on the project.

An irretrievable commitment is one in which a resource product or use is lost for a period of time while managing for another (USDA 1995, Vol. II, p. 4-93). For this project, no irretrievable commitments were identified.

4.7 Cumulative Effects

No cumulative effects were identified for this proposed project. Cumulative effects are the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions, which are collectively significant. One site proposed for treatment in 2010 had treatment in the past five years (See Table 3).

Table 3. Summary of Treatment History of 2010 Proposed Treatment Sites by Year and Treatment Method*.

County	2010 Site Name	Site Treatment History **					2010 Proposed Treatment
		2005	2006	2007	2008	2009	
Allen	Aboite 1-7	--	--	--	--	Btk	Btk
Kosciusko	Leesburg 1-8	--	--	--	--	--	Btk
Huntington /Wabash	Lagro 1-5	--	--	--	--	--	MD
Lake	Hobart 1-4	--	--	--	--	--	MD
Marshall	Tippecanoe 2010	--	--	--	--	--	MD

*Treatment method: Btk = *Bacillus thuringiensis* var. *kurstaki*

MD = Mating disruption

** Indicates previous treatment where there was partial overlap with the 2010 proposed treatment site.

4.8 Other Information

Mitigation

The Cooperative Gypsy Moth Project will implement the following safeguards and mitigating measures:

- News releases of treatments and dates will be given to local newspapers and radio/TV stations.
- Local safety authority will be notified by direct contact or phone calls.
- Prior to treatments, IDNR staff will coordinate with hospitals with helipads to communication times when aircraft may be flying near medical helicopter flight paths to assure aerial and ground safety.
- Employees of state and federal agencies monitoring the treatment will receive training on treatment methods to be able to answer questions from the public.
- Application of Btk will be suspended when school buses are in the site and when children are outside on school grounds.
- Aircraft will be calibrated for accurate application of treatment material.
- Applications will be timed so the most susceptible gypsy moth stage is targeted.

- Weather will be monitored during treatment to assure accurate deposition of the treatment material.
- The wind speeds during the application will be monitored by IDNR personnel and the aerial applicator will maintain the application within the boundaries of the proposed treatment site.
- Treatment will be avoided or stopped if winds are above the guidelines stated in the Work and Safety Plan.

Monitoring

During the treatments, ground observers and/or aerial observers will monitor the application for accuracy within the site boundaries, swath width, and drift. Application information (e.g. swath widths, spray-on and spray-off, acres treated, and altitude) will be downloaded to an operations-base computer.

The Btk and mating disruption treatment sites will be monitored using gypsy moth traps to determine the effectiveness of the treatments.

5.0 LIST OF PREPARERS

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EA Responsibility: Participated in writing and reviewing the environmental assessment and in the development of the proposed cooperative gypsy moth project.

Experience and Education: Experience as Forest Health Specialist since 1974 and experience in gypsy moth management since 1977. M.F., Duke University in Forest Entomology and Pathology; B.A., Catawba College in Pre-Forestry.

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Experience and Education: Forest entomologist with the USDA Forest Service in St. Paul, MN since 1993. Ph.D., Iowa State University in Entomology and Forest Biology; M.S., University of Arkansas-Fayetteville in Entomology; B.S., Iowa State University in Forestry and Entomology.

Angela Rust, SW Nursery Inspector and Compliance Officer, Division of Entomology and Plant Pathology, Indiana Department of Natural Resources, 145 24th Street, Tell City, Indiana 47586.

EA Responsibility: Participated in writing and reviewing the environmental assessment and in consultation of the proposed cooperative gypsy moth project.

Experience and Education: Nursery Inspector and Compliance Officer with the Indiana Department of Natural Resources, Division of Entomology and Plant Pathology since 1995. B.S., Purdue University in Entomology.

6.0 LIST OF PERSONS AND AGENCIES CONSULTED

Eric Biddinger, Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204. Consultation on treatment sites and proposed project.

Kallie Bontrager, Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204. Consultation on treatment sites and proposed project.

J. Matthew Buffington, Environmental Supervisor, IDNR Division of Fish and Wildlife, 402 West Washington Street, Room 273W, Indianapolis, IN 46204. Consultation on treatment sites and proposed project.

Vince Burkle, Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204. Consultation on treatment sites and proposed project.

Mike Connor, Forest Entomologist, USDA Forest Service, Forest Health Protection, 1992 Folwell Ave., St. Paul, MN 55108. Review of the Environmental Assessment.

James Glass, Director, IDNR Division of Historic Preservation and Archaeology, 402 West Washington Street, Room W274, Indianapolis, IN 46204. Consultation on historical properties of concern.

Scott Kinzie, Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204. Consultation on treatment sites and proposed project.

Donna Leonard, Entomologist, STS Coordinator, USDA Forest Service, FHP, P.O. Box 2680, Asheville, NC 28802. Consultation on treatment sites.

Scott Pruitt, Field Supervisor, US Fish and Wildlife Service, 718 North Washington Street, Bloomington, IN 47404. Consultation on threatened and endangered species.

Zack Smith, Forest Entomologist, IDNR Forestry, 402 West Washington Street, Room 296W, Indianapolis, IN 46204. Consultation on treatment sites and development of cooperative project.

Christie Stanifer, Environmental Coordinator, Environmental Unit, IDNR Division of Fish and Wildlife, 402 West Washington Street, Room 264W, Indianapolis, IN 46204. Consultation on treatment site and proposed project.

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APPENDIX A: ISSUES, QUESTIONS AND CONCERNS FROM PUBLIC INVOLVEMENT

The public involvement process begins with a mailing of letters to all the residents within the proposed treatment sites to notify them of public meetings scheduled to inform them about the proposed project. All questions, answers and comments are recorded from the public meetings. Contact information is also provided at the meetings to allow the public to comment by letter, phone or email at a later date. All comments received after the public meetings are recorded and a response given to the resident by phone, email, letter or a combination of the above.

All questions, comments and concerns from the meetings, letters, emails and phone calls are summarized in this appendix.

At each of the public meetings (Table 1), representatives from the Division of Entomology and Plant Pathology presented the proposed gypsy moth project, and answered and received questions and comments. The presentation explained:

- the life cycle, feeding habits and hosts of gypsy moth,
- the identification of gypsy moth,
- survey methods,
- gypsy moth impacts and damage to the trees and forest,
- selection of proposed sites,
- selection of the treatment options,
- the timing and application of treatments,
- boundaries of the treatment sites with maps and photos,
- and the public comment time period and decision process.

Both during and following the presentation, questions and comments were taken, answered and discussed with the people attending the meetings. A representative from Purdue University also attended one of the meetings and assisted in answering and discussing questions and comments.

The questions and comments received at the public meetings and after the public meetings concerned four main issues:

- Human and animal health and safety;
- Nontarget effects and environmental effects;
- Economic and political impacts;
- Likelihood of success of the proposed project, past projects and the treatment options proposed.

ISSUES

Human health and safety

The questions and comments received from the public regarding human health and safety were in three areas:

- The use and risks of Btk and mating disruption
- The decision and notification process for the implementation of the project
- The time of application of Btk and mating disruption
- The security measures taken during the project

Btk questions were asked concerning the risk to adults and children; when people can go outside again after a treatment and if there is any kind of irritation caused by the product. The responses explained that no hazards-either immediate or cumulative, have been identified for the general public when exposed to Btk; that Btk naturally occurs in the soil; that treatments are not conducted when school buses or children are outside in the site; that Btk is applied to foliage, it breaks down in the environment in a few days; and that Btk dries in about 30 minutes and we recommend people wait that amount of time before going outside. The questions were also asked regarding how long Bt products have been available for use and how long they have been used in Indiana. Bt products have been available for use 30-40 years and used in Indiana approximately 20 years and it is a product commonly used in organic gardening.

Mating disruption questions were asked concerning the risk to adults and children. It was responded that no hazards, either immediate or cumulative, have been identified for the general public when exposed to pheromone products and the pheromone is specific to the gypsy moth. It was asked if the pheromone affected water tanks for animals. It was stated that it did not affect water supply for animals and that the pheromone applied is a duplication of the natural pheromone already being released by adult female gypsy moths. A question was asked about how long the pheromone stays in the air and it was replied approximately 6 weeks.

Mating disruption questions were asked regarding what kind of complaints do we normally get during treatments and it was stated that we have received complaints regarding the early time of day of the treatment and the planes flying low.

Questions that were asked regarding the decision and notification process for proposed treatments were: would the public be notified when the treatments will occur and would updates be posted on the website. The responses explained that residents will be notified by mail approximately two weeks prior to the treatment; that residents would be notified through local media (radio, television, newspaper) a couple days prior to the treatment and that updates will be posted to our IN Dept. of Natural Resources website and Twitter website. Local emergency personnel and the county Purdue cooperative extension service would also be notified.

Questions were asked regarding the time of the application and the response was that the timing of the treatments was dependent upon weather conditions and that treatments are generally started in the early morning hours (first light). Btk treatments are applied during May and mating disruption treatments are applied during June. Most sites treated with Btk will receive two applications, with the second application being 4-10 days after the first application. Mating disruption sites will receive one application.

A question was asked regarding how low the planes fly and the response stated that the treatment planes fly low, just over the tree tops. Usually 50-100 feet above the tree tops, but sometimes higher depending on the site.

Nontarget effects and environmental effects

Questions were asked if Btk affects mammals, fish, birds, nontarget lepidopteran, other insects, or ground water. It was responded that Btk does not negatively affect mammals, fish, birds or other insects. Btk naturally exists in soil, breaks down quickly in the environment and does not affect ground water. Bt products are commonly used in organic gardening. It was stated that Btk can affect other nontarget butterfly and moth (lepidopteran) caterpillars; however Btk will be applied at a time of year when the majority of caterpillars have not hatched yet. The Eastern Tent Caterpillar is a species that might be out at the same time as the Btk treatments. Btk only affects the larval or caterpillar stage. The question was asked if there are concerns for pets getting Btk on their paws. The reply stated that since Btk exists naturally in the soil, it is a substance that outside pets are already coming into contact with and the amount of Btk that a pet might get on their paws is very minimal.

The question was asked if the gypsy moth caterpillars posed a risk to domestic animals. It was stated that they do not pose a risk.

Economic and political impacts

A citizen wanted to know what would happen to the comments made by the public. The reply stated that all comments would be reviewed by the DNR and cooperating agencies and that all comments would be considered when making the final decision. It was asked if the funding for the project was provided by the state and it was replied that the funding costs were shared by the Indiana DNR and the US Forest Service.

Questions were asked if the treatment in Lake County would be done with mating disruption or Btk. The response stated that mating disruption would be used if enough federal funding was available. A citizen asked if they could put in a request to be dropped from the treatment area, and it was replied that they could put in a request to our office.

The question was asked if there have been pests introduced into the United States from around the world and it was replied, that with introduced global trade we have seen many kinds of insect pests introduced from other countries.

It was asked how other states such as Eastern states and Michigan were affected by gypsy moth and if they conducted treatments. It was replied that these states do suppression treatments to knock down populations during heavy outbreaks.

Comments were sent to us after the meetings in Allen County and Marshall County praising the knowledge and professionalism of the speakers. Other positive comments were received from residents at each of the public meetings or through calls, emails or letters after the meetings.

Some concerns were raised by some individuals (a minority) regarding the affect that Btk or mating disruption might have on allergies, asthma or other respiratory problems. Any comments made at the public meeting, in addition to any subsequent comments received by phone, letter or email were documented.

Some complaints were received by phone and at the public meeting from residents in the Hobart treatment site in Lake County regarding the short delivery notice of the postcards for the public meeting. In our reply, we apologized for the late notice of the postcards and reviewed the mailing process with our mailing service provider. All postcards were received on time for all other sites. Residents were also informed that they had until Feb. 19th to make comments (the Hobart public meeting date was January 21).

Likelihood of success of the proposed project and the treatment options proposed

Mating disruption questions: A question was asked if it was a problem to get rain after the treatment and it was replied that rain does not affect the success of the treatment. A question was asked regarding what kind of success rate that the citizens might see in the Wabash/Huntington and Marshall County treatment sites. The reply stated that the degree of success using mating disruption is likely good, in this site with a very low population. A citizen asked if we had seen natural predators/enemies since we had been treating for gypsy moth in Indiana. The reply was that we have seen the presence of natural enemies, but surveys have not been conducted to quantify their populations. It was asked how mating disruption works and it was explained that the abundance of the female pheromone in the air confuses the male moths and make it difficult for them to detect the females. The abundant pheromone causes the male to keep searching for females without ever finding one.

A question was asked if we had something on the ground to monitor distribution and success of the delivery of the product and it was replied that we would be able to see the distribution of the product on our cars, do visual checks, and the aerial applicators will monitor the calibration and dispersal from the planes.

It was asked if mating disruption treatments were less effective than Btk treatments. The reply stated that both treatments are effective and used according to the population level present and life stages found in the site.

Btk questions: A citizen asked if we had seen natural predators/enemies since we had been treating for gypsy moth in Indiana. The reply was that we have seen the presence of natural enemies, but surveys have not been conducted to quantify their populations. The question was then asked about how we evaluate success after a treatment. The reply stated that the degree of success is evaluated on the number of male moths trapped in the area later that year and whether or not egg masses are found during the fall survey. The question was asked regarding how effective is Btk and it was stated that usually 70% of the caterpillars are killed, depending on the climate conditions after the treatment. It was also asked if rain affects the Btk and it was replied that as long as the Btk has time to dry before it rains, then rain will not affect the success of the treatment. A question was asked why there were still gypsy moths in Allen County, if we had treated in Allen County in prior years. It was replied that the treatments would slow the spread of gypsy moth, but not eradicate the population.

Other questions and concerns

Questions were asked about: trapping and survey methods; who they could contact to come look at their trees; general biology questions about gypsy moth; what control options were available to homeowners and what other controls are being explored; what natural predators/pathogens were present in Indiana; how to look for egg masses; how soon defoliation might occur; what plant species gypsy moth prefers; where gypsy moth came from; how proposed treatment sites are determined and questions regarding other insect pest issues and their control.

The response for trapping and survey methods explained how traps are set based on a grid system and how moth counts are used to locate increasing populations and then the moth counts are then used to try and locate egg masses. The quantity and location of moths and egg masses and locations of habitat determine whether an area is proposed for treatment or not and what the boundaries of the proposed treatment site are.

The response for whom to contact to investigate possible gypsy moth finds on properties stated that the IDNR would send a local employee out to examine trees.

Several general questions on biology were responded to, by restating information from the presentation slides and by explaining the difference between gypsy moth and other common caterpillars.

Control and survey options for homeowners were explained such as: burlap banding, soybean oil spray (Golden Pest Spray Oil) and insecticide sprays. It was stated that egg masses can be found anywhere on a tree or on any outdoor article, house or vehicle and that people are the ones transporting this insect. Gypsy moth defoliation may not occur for several years in an infested area.

It was responded that Indiana does have some natural animal and bird predators and also two pathogens that can kill gypsy moth. These pathogens are specific to gypsy moth.

The responses of preferred gypsy moth hosts included many urban landscape tree and shrub species, with over 500 known species as hosts.

It was explained that gypsy moth was native to Europe and was introduced into Massachusetts and that there is another species of gypsy moth that is sometimes found in North America that is native to Asia.

It was asked how long gypsy moths have been in the Allen County and it was replied that the moths have been there for over 10 years.

Lastly, a number of other responses were given in answer to questions on Emerald ash borer and other insects, based on the information given at the meeting.

Table 1. Date, time and attendance of the public meetings for the proposed treatment sites by county.

COUNTY	SITE	DATE	TIME	# Attending
Allen	Aboite 1-7	January 27, 2010	2:00 PM 6:00 PM	39
Kosciusko	Leesburg 1-8	February 01, 2010	6:00 PM	5
Huntington/Wabash	Lagro 1-5	January 28, 2010	6:00 PM	10
Lake	Hobart 1-4	January 21, 2010	3:30 PM 6:00 PM	33
Marshall	Tippecanoe 2010	February 02, 2010	6:00 PM	13
Total in attendance for all meetings				100

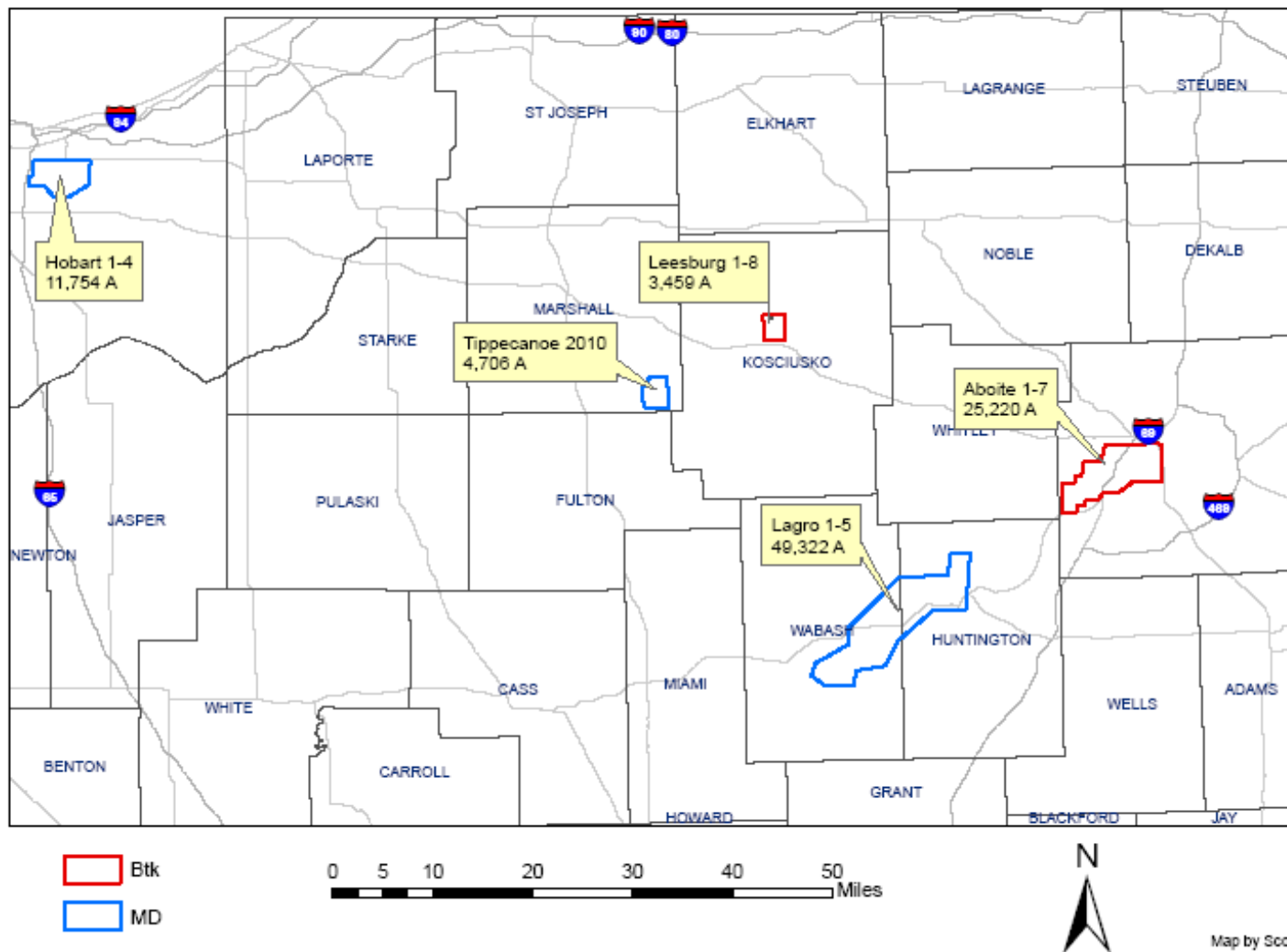
APPENDIX B. MAPS OF PROPOSED TREATMENT SITES

COUNTY	SITE NAME	TREATMENT	MAP TYPE	PAGE
Indiana	All Sites		Street	B-2
Allen	Aboite 1-7	Btk x 2	Topographic	B-3
Kosciusko	Leesburg 1-8	Btk x 2	Topographic	B-4
Huntington/Wabash	Lagro 1-5	MD	Topographic	B-5
Lake	Hobart 1-4	MD	Topographic	B-6
Marshall	Tippecanoe 2010	MD	Topographic	B-7

Btk x 2 = *Bacillus thuringiensis* var. *kurstaki* with two aerial applications.
MD = Mating disruption using SPLAT or pheromone flakes at 6 grams per acre.



2010 Proposed Gypsy Moth Aerial Treatment Sites State-Wide View



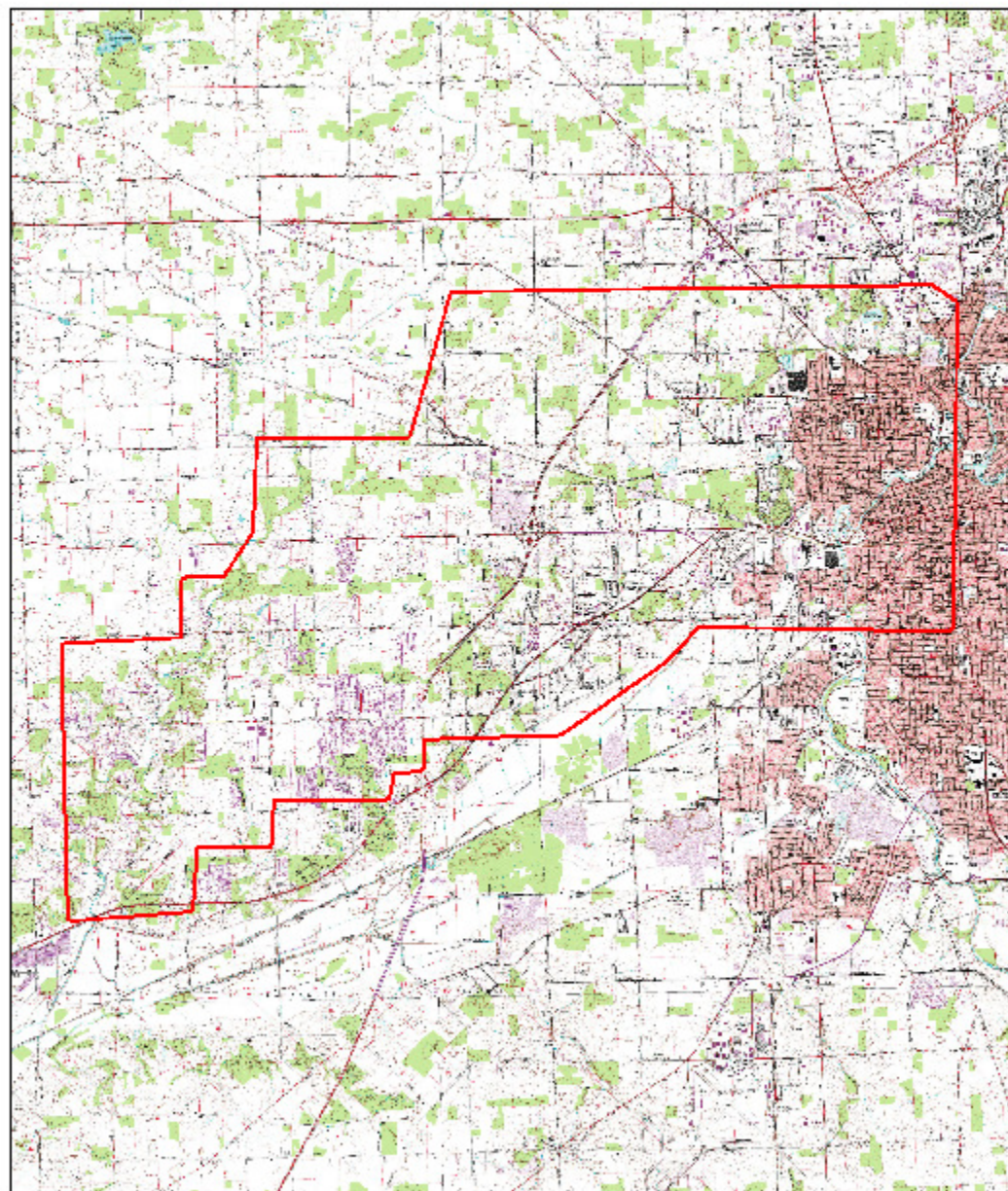
2010 Proposed Gypsy Moth Sites

Allen County

Site Name: Aboite 1-7

Acres: 25,220

Treatment: Btk



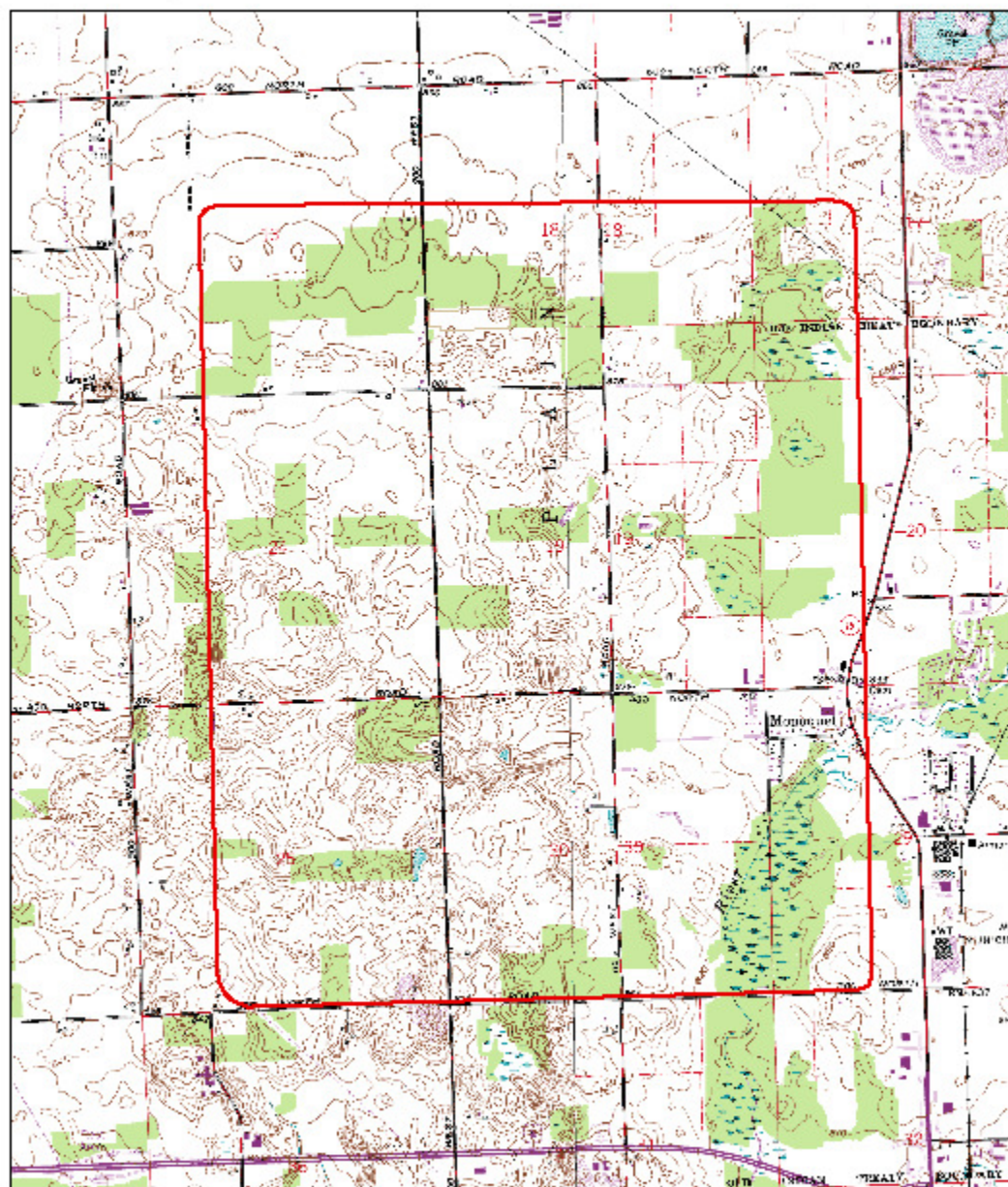
Map by Scott Kinzie

2010 Proposed Gypsy Moth Sites Kosciusko County

Acres: 3,459

Site Name: Leesburg 1-8

Treatment: Btk



Map by Scott Kinzie

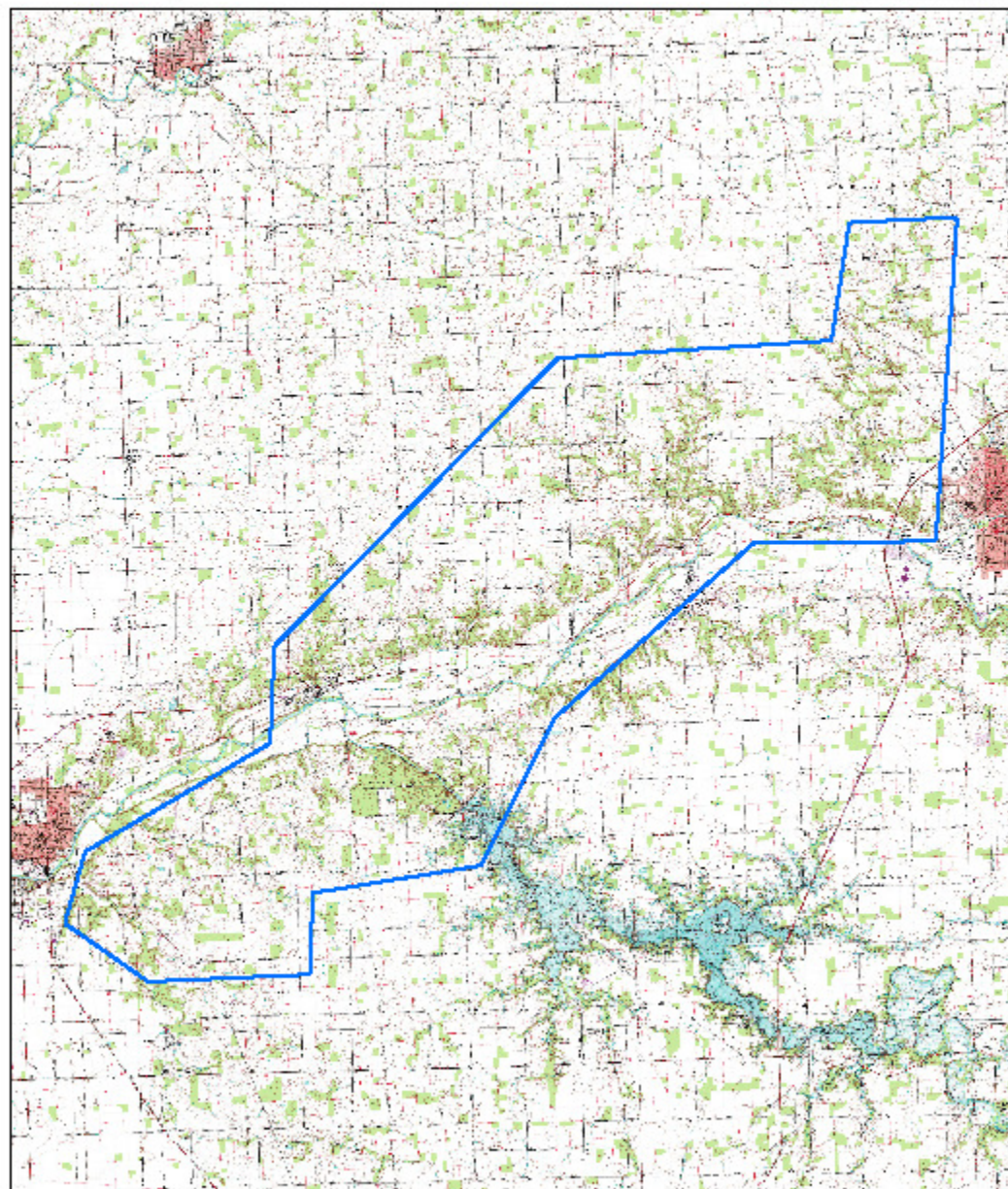
2010 Proposed Gypsy Moth Sites

Wabash / Huntington Counties

Acres: 49,322

Site Name: Lagro 1-5

Treatment:
Mating Disruption



Map by Scott Kinzie

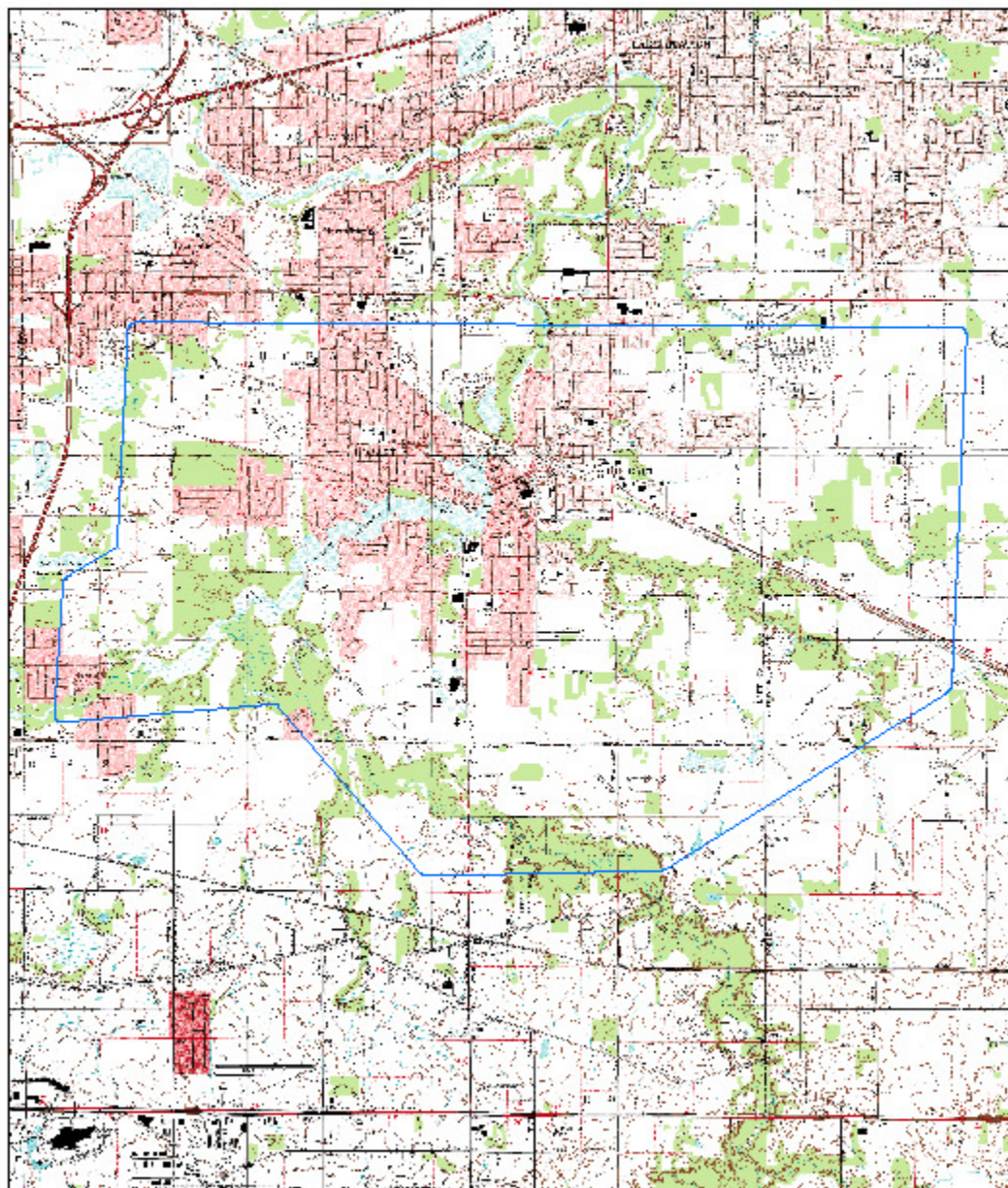
2010 Proposed Gypsy Moth Sites

Lake County

Site Name: Hobart 1-4

Treatment:
Mating Disruption

Acres: 11,754



0 0.3 0.6 1.2 1.8 2.4 3 Miles

Map by Scott Kinzie



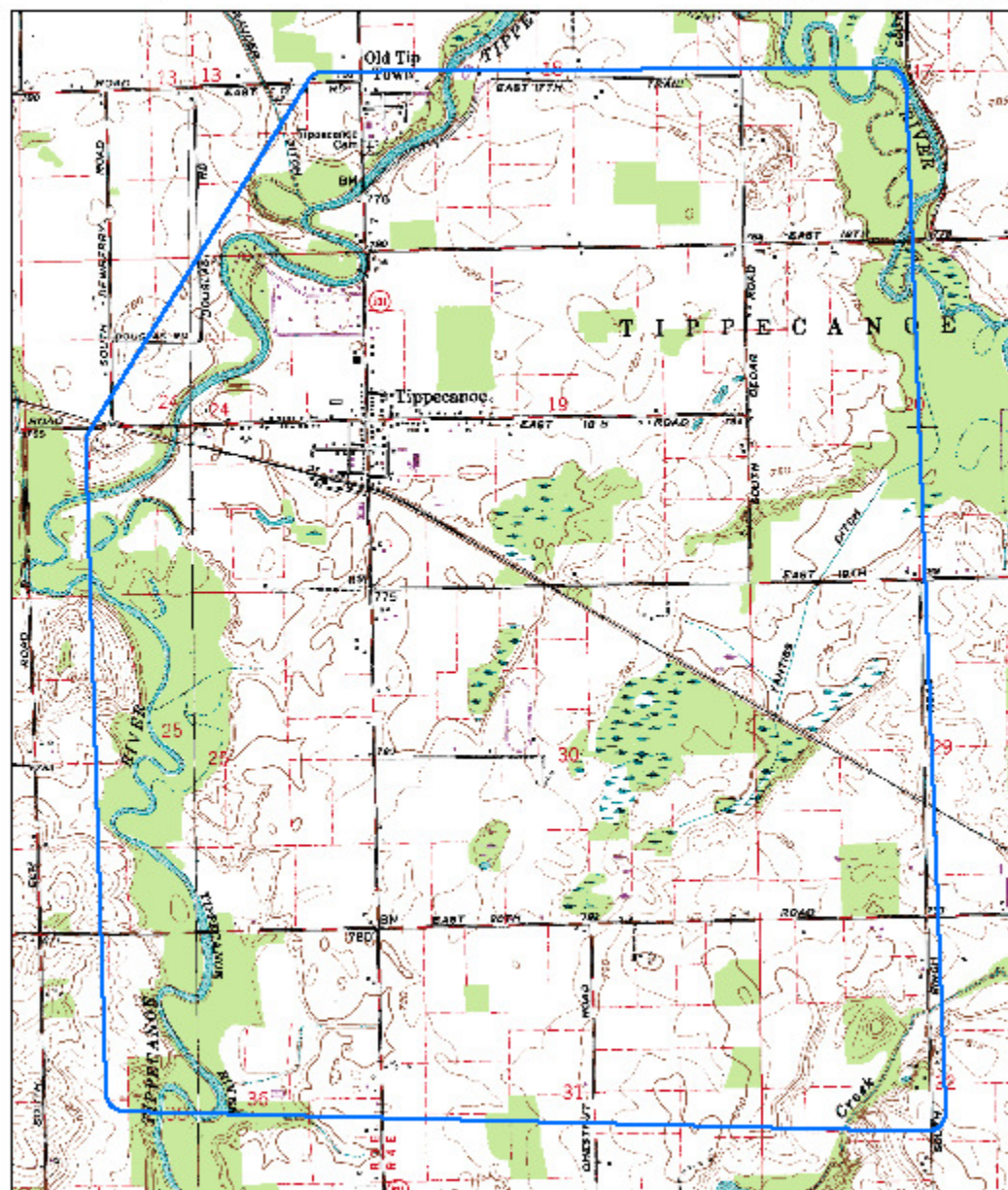
2010 Proposed Gypsy Moth Sites

Marshall County

Site Name: Tippecanoe 2010 Treatment:

Acres: 4,706

Mating Disruption



0.0 0.1 0.2 0.3 0.4 0.5
Miles

Map by Scott Kinzie

APPENDIX C. AGENCY LETTERS



United States Department of the Interior Fish and Wildlife Service



Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

January 20, 2010

Mr. Philip Marshall
Indiana DNR, Division of Entomology and Plant Pathology
402 West Washington Street, Room 290
Indianapolis, Indiana 46204

Dear Mr. Marshall:

The U.S. Fish and Wildlife Service (FWS) has reviewed your letter of December 23, 2009 regarding the 2010 gypsy moth treatment program for 6 sites in 7 Indiana counties (Allen, Kosciusko, Huntington/Wabash, Lake, Marshall and Porter). In subsequent communication you stated that the Porter County treatment block has been deleted from the 2010 program. You also stated that the Hobart treatment area in Lake County has been modified with regard to the Disrupt II treatment rate and possibly the size of the Btk treatment block. We are submitting the following comments on the 2010 program.

These comments have been prepared under the authority of the Endangered Species Act of 1973, and are consistent with the intent of the National Environmental Policy Act of 1969.

The original plan submitted in your letter includes aerial spraying of mating disruption pheromone flakes (Disrupt II) at 4 sites including 5 counties (114,914 acres total), and aerial spraying of *Bacillus thuringiensis* biological control (Btk) at 3 sites (29,568 acres). The modified plan is reduced to 65,782 acres of Disrupt II spraying. No ground treatment is proposed in 2010.

Endangered Species

Endangered butterflies

One of the proposed treatment methods, spraying with *Bacillus thuringiensis* (Btk), is of concern for 2 federally endangered species of Lepidoptera in Indiana, the Karner blue butterfly (*Lycaeides melissa samueulis*) and Mitchell's satyr butterfly (*Neonympha mitchelii*). The known occurrences of these 2 endangered species are in the northern portions of Lake and Porter Counties (Karner blue butterfly), and isolated locations in LaPorte and LaGrange Counties (Mitchell's satyr). The range of these species has not changed since our review of the 2009 gypsy moth program. Neither species is known to occur near any of the Btk treatment sites identified in your letter.

Treatment with Disrupt II pheromone flakes, (which will occur in Lake and Porter Counties) is considered to be highly specific for gypsy moths, and is not known to have adverse impacts on the federally listed butterflies.

One Bkt treatment site in Lake County (Hobart BT block - 889 acres) is within 5 miles of the Karner blue butterfly area and is in the vicinity of several State nature preserves that may support state-endangered or rare butterflies. To avoid any potential for adverse impacts to rare butterflies we recommend that aerial treatment in this area be limited to the Disrupt II flakes. However, if aerial treatment is implemented when the wind is not blowing toward the Karner blue butterfly area (northward), we concur that the project is not likely to adversely affect this species.

Other Endangered Species

The proposed treatment sites are within the range of the federally endangered Indiana bat (*Myotis sodalis*) (entire state), and clubshell mussel (*Pleurobema clava*) (Kosciusko County), and the federally threatened copperbelly water snake (*Nerodia erythrogaster neglecta*) (Kosciusko County). In Kosciusko County the clubshell is found only in the Tippecanoe River and the copperbelly water snake records are from wetlands associated with natural lakes which are not near the treatment areas. The proposed Bkt treatment in Kosciusko County includes a reach of the Tippecanoe River, however we have no information to indicate that Bkt causes adverse effects on mussels or reptiles.

Indiana bats hibernate in caves, then disperse to reproduce and forage in relatively undisturbed forested areas associated with water resources during spring and summer. Young are raised in nursery colony roosts in trees, typically near drainageways in undeveloped areas. Prior to hibernation, Indiana bats feed intensively in forested areas near hibernacula in order to build up adequate fat reserves to survive hibernation.

The diet of Indiana bats consists entirely of insects. Based on previous studies they appear to be somewhat opportunistic feeders. Some studies have found lepidopterans as a major dietary component, while others found a diet dominated by terrestrial Coleopterans or aquatic insects. Most of these studies were essentially "snapshots" and there is a lack of comprehensive, long-term research. It is possible that under some circumstances extensive elimination of a broad range of lepidopteran species over a large habitat area has the potential to adversely affect the food base of an Indiana bat nursery colony. None of the proposed treatment areas are near Indiana bat hibernacula, and there are no summer records of Indiana bats near enough any of the Btk sites (the closest record is approximately 6 miles from the Kosciusko County site). We estimate that the 2010 Btk aerial treatment sites could cover up to 600-700 acres of good quality Indiana bat summer habitat in Kosciusko County (including the Tippecanoe River, extensive bottomland forest and wetlands), and up to 3000 acres of moderate/good summer habitat in Allen County (a combination of riparian, wetland and upland forest, much of which is surrounded by suburban development).

The threshold and extent of adverse effects of a loss of lepidopteran forage base on Indiana bats is uncertain, therefore at this time we consider the likelihood of take from the 2010 program to be discountably small. However, to minimize impacts on foraging Indiana bats we recommend that

aerial spraying at those 2 sites listed be conducted as early as possible in the season, avoiding large blocks of forest wherever possible. The Indiana bat summer occupancy season begins in early April, probably slightly later in northern Indiana. If future programs incorporate large scale application of Dimilin, or propose BT aerial application near areas of endangered butterflies or over very large areas of Indiana bat summer or winter habitat, this issue will have to be reevaluated.

The FWS concludes that the federally assisted 2010 gypsy moth program is not likely to adversely affect any of these federally listed species.

Some of the sites are within the range of the federal candidate eastern massasauga rattlesnake (*Sistrurus catenatus*) (Allen and Kosciusko Counties) and the rayed bean mussel (*Villosa fabalis*) (Allen County). Candidate species are not afforded protection under the Endangered Species Act, but these species may be proposed for listing in the future.

Other Species of Concern

A bald eagle nest is located within the boundaries of the Lagro block, and a great blue heron rookery is located within the Leesburg block (see attachment). We do not anticipate adverse impacts on the nests from spraying of Disrupt or Bkt, provided there is no physical disturbance of the nests.

If the aforementioned condition for Karner blue butterflies is implemented, this precludes the need for further consultation on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. If, however, new information on endangered species at the site becomes available or if project plans are changed significantly, please contact our office for further consultation.

For further discussion, please contact Mike Litwin at (812) 334-4261 ext. 205.

Sincerely yours,


Scott E. Pruitt
Supervisor

cc: Christie Keifer, Indiana Division of Fish and Wildlife, Indianapolis, IN
USFWS, Chesterton, IN

THIS IS NOT A PERMIT

State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Water

Early Coordination/Environmental Assessment

DNR #: ER-14563 **Request Received:** December 23, 2009

Requestor: Indiana Department of Natural Resources
Philip T. Marshall
Division of Entomology & Plant Pathology
402 W. Washington Street Rm W290
Indianapolis, IN 46204

Project: 2010 proposed gypsy moth treatment sites

County/Site info: Allen - Kosciusko - Huntington - Lake - Marshall - Wabash
The Indiana Department of Natural Resources has reviewed the above referenced project per your request. Our agency offers the following comments for your information and in accordance with the National Environmental Policy Act of 1969.

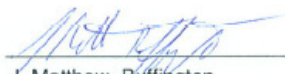
Regulatory Assessment: Formal approval by the Department of Natural Resources under the regulatory programs administered by the Division of Water is not required for this project.

Natural Heritage Database: The Natural Heritage Program's data have been checked. Enclosed are maps and tables which describe significant natural features within and near the proposed gypsy moth treatment areas.

The only specific comment we would like to offer is for the Hobart treatment area. The large Hobart 1-4 mating disruption option contains Cressmoor Prairie Nature Preserve, which has many rare butterflies and moths (see Cressmoor Prairie list enclosed). We would like confirmation that the mating disruption treatment targets only gypsy moth and will not impact these rare lepidopterans. For the smaller Hobart 1-4 Btk X 2 option, no rare species or protected areas are mapped, so we have no concerns.

Fish & Wildlife Comments: The devastating effects of uncontrolled gypsy moth infestations are well documented. Effects on non-target species are possible and care should be taken near areas that could possibly possess endangered or threatened species, or species of concern. The effects on target species will depend on a variety of factors and are impossible to predict with certainty. However, controlling the spread of gypsy moths is important to reduce the negative effects the caterpillars have on trees, particularly oaks. At this time, no harm to state or federal listed species resulting from the proposed control measures is known or anticipated. The potential harm from the project is less than the potential harm to these same species from an uncontrolled gypsy moth infestation. Time the application of Btk to maximize its effects on gypsy moth caterpillars.

Contact Staff: Christie L. Stanifer, Environ. Coordinator, Fish & Wildlife
Our agency appreciates this opportunity to be of service. Please do not hesitate to contact the above staff member at (317) 232-4160 or 1-877-928-3755 (toll free) if we can be of further assistance.


J. Matthew Buffington
Environmental Supervisor
Division of Fish and Wildlife

Date: January 21, 2010

Attachments: A - General Information



Indiana Department of Natural Resources

Mitchell E. Daniels, Jr., Governor
Robert E. Carter, Jr., Director

Division of Entomology & Plant Pathology, 402 W. Washington St. Rm W 290, Indianapolis, IN 46204, 317-232-4120

TO: Mike Neyer, Division Director, Division of Water

FROM: Phil Marshall, State Entomologist and Forest Health Specialist, Div. of Entomology and Plant Pathology

SUBJECT: Reply to your request regarding mating disruption impact on only gypsy moth and not rare lepidopterans in the Cressmour Prairie Nature Preserve within the Hobart treatment sites (DNR Assessment ER-14563)

DATE: March 18, 2010

"Disparlure is a naturally occurring insect pheromone produced by the female gypsy moth....Although disparlure is considered highly selective for gypsy moths, there is some evidence showing that disparlure may have effects on the mating of other species of moths (Draft Supplemental Environmental Impact Statement, Vol. III, Appendix H, Sect. 4.1.2.3.)."

"It appears that disparlure is not completely selective for gypsy moth. Although studies have not been conducted, it is possible that other closely related species of moths could also respond to disparlure (Draft Supplemental Environmental Impact Statement, Vol. III, Appendix H, Sect.4.1.2.3.)." For example, Nun moths (*Lymantria monacha*) and *Lymantria fumida* (a species native to Japan) produce disparlure. Both species belong to the same family (Lymantriidae) as the gypsy moth (*Lymantria dispar*).

Staff reviewed the list of lepidopteran species provided from the Natural Heritage Program database for the Cressmour Prairie Nature Preserve in Hobart 1-4 site. None of the species listed belong to the lepidopteran family Lymantriidae. Therefore, we are not aware of, and do not believe there will be, any potential impact on the rare species reported in the nature preserve.

If you have any questions regarding the site or treatment with mating disruption please contact Phil Marshall at 317-232-4189, Scott Kinzie at 317-234-0187 or Angela Rust at 812-547-0971.

Thank you,

Philip T. Marshall
State Entomologist and Forest Health Specialist

PTW

Cc: Angela Rust, Scott Kinzie

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Indiana Department of Natural Resources

Mitchell E. Daniels, Jr., Governor
Robert E. Carter, Jr., Director

Division of Historic Preservation & Archaeology • 402 W. Washington Street, W274 • Indianapolis, IN 46204-2739



January 20, 2010

Philip T. Marshall
Indiana Department of Natural Resources
Division of Entomology and Plant Pathology
402 West Washington Street, Rm W290
Indianapolis, Indiana 46204

State Agency: Indiana Department of Natural Resources

Re: Project information concerning the gypsy moth treatment sites for 2010 (DHPA #8407)

Dear Mr. Marshall:

Pursuant to Indiana Code 14-21-1-18 the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology ("DHPA") has conducted a review of the materials dated and received by the DHPA on December 23, 2009, for the above indicated project in Allen, Huntington, Kosciusko, Lake, Marshall, Porter and Wabash Counties, Indiana.

Based on our analysis, we do not believe that any historic properties will be altered, demolished, or removed by the proposed project.

If you have any further questions regarding this determination, please contact the DHPA. Questions about historic buildings or structures pertaining to this project should be directed to Miriam Widenhofer at (317) 233-3883 or mwidenhofer@dnr.IN.gov. Additionally, in all future correspondence regarding the above indicated project, please refer to DHPA #8407.

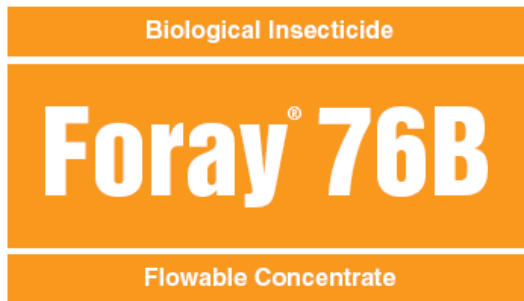
Very truly yours,


James A. Glass, PhD
Director, Division of Historic Preservation & Archaeology

JAG:MLW:mlw

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APPENDIX D. EXAMPLE OF PRODUCT LABELS



For the control of Lepidopterous Larvae

ACTIVE INGREDIENT:

Bacillus thuringiensis subsp. *kurstaki*,
strain ABTS-351, fermentation solids, spores,
and insecticidal toxins 18.44%
Other Ingredients: 81.56%
Total: 100.0%

Potency: 16,700 Cabbage Looper Units (CLU)/mg
of product (equivalent to 76 billion CLU/GAL.).

The percent active ingredient does not indicate
product performance and potency measurements
are not federally standardized.

EPA Reg. No. 73049-49

EPA Est. No. 33762-IA-001

LIST NO. 60176

INDEX:

- 1.0 First Aid
- 2.0 Precautionary Statements
 - 2.1 Hazards to Humans and Domestic Animals
 - 2.2 Personal Protective Equipment (PPE)
 - 2.3 Agricultural Use Requirements
 - 2.4 Non-Agricultural Use Requirements
 - 2.5 User Safety Recommendations
 - 2.6 Environmental Hazards
- 3.0 Directions for Use
- 4.0 Storage and Disposal
- 5.0 Agricultural Use Requirements
- 6.0 Non-Agricultural Use Requirements
- 7.0 Application
- 8.0 Mixing
- 9.0 Spray Volumes
- 10.0 General Agricultural Use Instructions
- 11.0 Table 1
- 12.0 General Non-Agricultural Use Instructions
 - 12.1 Ground Application
 - 12.2 Aerial Application
- 13.0 Table 2
- 14.0 Notice of Warranty

KEEP OUT OF REACH OF CHILDREN
CAUTION

1.0

FIRST AID	
If on skin or clothing	<ul style="list-style-type: none">Take off contaminated clothing.Rinse skin immediately with plenty of water for 15-20 minutes.Call a poison control center or doctor for treatment advice.
If in eyes	<ul style="list-style-type: none">Hold eye open and rinse slowly and gently with water for 15-20 minutes.Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.Call a poison control center or doctor for treatment advice.
HOT LINE NUMBER	
Have the product container with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-877-315-9819 for emergency medical treatment and/or transport emergency information. For all other information, call 1-800-323-9597.	

2.0

PRECAUTIONARY STATEMENTS

2.1

HAZARDS TO HUMANS AND DOMESTIC ANIMALS CAUTION

Harmful if absorbed through the skin. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Remove and wash contaminated clothing before reuse.

2.2

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt
- Long pants
- Waterproof gloves
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions are available for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

2.3

Agricultural Use Requirements

Mixers/loaders and applicators must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, or P-95. Repeated exposure to high concentrations of microbial proteins can cause allergic reactions. When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

IMPORTANT: When reduced PPE is worn because a closed system is being used, handlers must provide all PPE specified above for "applicators and other handlers" and have such PPE immediately available for use in an emergency, such as a spill or equipment breakdown.

2.4

Non-Agricultural Use Requirements

Mixer/loaders and applicators not in enclosed cabs or aircraft must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, or P-95. Repeated exposure to high concentrations of microbial proteins can cause allergic sensitization.

CONTINUED

2.5 User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling the product. Wash outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

2.6 Environmental Hazards

For terrestrial agricultural uses, do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

This product must not be applied aerially within 1/4 mile of any habitats of threatened or endangered lepidoptera. No manual application can be made within 300 feet of any threatened or endangered lepidoptera.

3.0 DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.

Do not apply this product through any type of irrigation system.

4.0 STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal of waste.

Pesticide Storage: Store in a cool, dry place. Keep containers tightly closed when not in use. Store in temperatures above freezing and below 25° C (77° F).

Pesticide Disposal: To avoid wastes, use all material in this container by application according to label directions. If wastes cannot be avoided, offer remaining product to a waste disposal facility or pesticide disposal program (often such programs are run by state or local governments or by industry).

Container Disposal: Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after flow begins to drip. Repeat this procedure two more times. Once cleaned, offer container for recycling, if available. If recycling is not available, puncture and dispose of container in a sanitary landfill or by other procedures approved by state and local authorities.

5.0 AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Waterproof gloves
- Shoes plus socks

6.0 NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses.

For ground applications only. Exposure of unprotected persons can be mitigated by direct spraying. Spray should be allowed to dry undisturbed.

7.0 APPLICATION

Apply Foray 76B by ground or aerial equipment undiluted or with quantities of water sufficient to provide thorough coverage of plant parts to be protected. The amount of water needed per acre will depend upon crop size, weather, spray equipment, and local experience.

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related factors determine the potential for spray drift. The applicator and the grower /treatment coordinator are responsible for considering all of these factors when making decisions.

8.0 MIXING

Shake or stir Foray 76B before use. Fill spray or mixing tank half full of water. Begin agitation and pour Foray 76B into water while maintaining continuous agitation. Add other spray material (if any) and balance of water. Agitate as necessary to maintain suspension. Do not allow diluted mixture to remain in the tank for more than 72 hours.

To improve weather-fastness of the spray deposits for hard to wet crops, such as cole crops, use a spreader-sticker approved for use on growing crops. Combinations with commonly used spray tank adjuvants are generally not deleterious to Foray 76B, if the mix is used promptly. Before mixing in the spray tank, identify possible problems with physical compatibility by mixing all components in a small container in proportionate quantities.

9.0 SPRAY VOLUMES

Ground Application: Use amount of Foray 76B, as indicated in the tables that follow, in ground equipment with quantities of water sufficient to provide thorough coverage of plant parts to be protected. The amount of water needed per acre will depend upon crop size, weather conditions, spray equipment used and local experience.

Aerial Application: Use amount of Foray 76B, as indicated in the tables that follow, in aerial equipment undiluted or with quantities of water sufficient to provide thorough coverage of plant parts to be protected. In the western U.S., use a normal minimum of 5-10 gallons per acre; in the eastern regions, use a normal minimum of 2-3 gallons per acre. The minimum amount of water needed per acre will depend upon crop size, weather conditions, spray equipment used and local experience.

10.0 GENERAL AGRICULTURAL USE INSTRUCTIONS

Foray 76B is a biological insecticide for the control of lepidopterous larvae. It contains the spores and endotoxin crystals of *Bacillus thuringiensis kurstaki*. Foray 76B must be ingested by the larvae to be effective. For consistent control, apply at first sign of newly hatched larvae (1st and 2nd instar larvae). Susceptible larvae that ingest Foray 76B cease feeding within a few hours and die within 2-5 days.

Foray 76B may be applied up to and on the day of harvest. For maximum effectiveness, follow the instructions listed below:

Monitor fields to detect early infestations.

Apply Foray 76B when eggs start hatching and larvae are small (early instars) and before significant crop damage occurs. Larvae must be actively feeding to be affected.

Repeat applications every 3 to 14 days to maintain control and protect new plant growth. Factors affecting spray interval include rate of plant growth, weather conditions, and reinfestations. Monitor populations of pests and beneficials to determine proper timing of applications.

Under conditions of heavy pest pressures or when large worms are present use the higher rate, shorten the application interval, and/or improve spray coverage to enhance control. When these conditions are present, consider use of a contact insecticide to enhance control.

Thorough coverage is essential for optimum performance. Ground applicators equipped with directed drop nozzles can improve coverage.

11.0 Table 1.

Crop	Pests	Rate ¹ (fl. oz./acre)
Forests, Shade Trees, Ornamentals, Shrubs, Sugar Maple Trees, Ornamental Fruit, Nut & Citrus Trees ²	Gypsy Moth ² Elm Spanworm	13.5 - 67.5
	Spruce Budworm Browntail Moth Douglas Fir Tussock Moth Coneworm Buck Moth	13.5 - 50.5
	Tussock Moth Pine Butterfly Bagworm Leafroller Tortrix Mimosa Webworm Tent Caterpillar Jackpine Budworm Blackheaded Budworm Saddled Prominent Saddleback Caterpillar Eastern & Western Hemlock Looper Orangestriped Oakworm Satin Moth	10.0 - 27.0
	Redhumped Caterpillar Spring & Fall Cankerworm California Oakworm Fall Webworm	7.0 - 13.5

Special Instructions

¹Use the higher recommended rates on advanced larval stages or under high density larval populations.

²In treating gypsy moth infested trees and shrubs in urban, rural, and semi-rural areas, exposure of non-target vegetation including, but not limited to, native and ornamental species and food or feed crops is permitted.

This product can be mixed and used with other pesticides only in accordance with the most restrictive of label limitations and precautions. This product cannot be mixed with any product containing a label prohibition against such mixing. No label dosage rates may be exceeded.

12.0 GENERAL NON-AGRICULTURAL USE INSTRUCTIONS

Not for use on plants being grown for sale or other commercial use, or for commercial seed production, or for research purposes. For use on plants intended for aesthetic purposes or climatic modification and being grown in interior landscapes, ornamental gardens or parks, or on golf courses or lawns and grounds.

Not for use on trees being grown for sale or other commercial use, or for commercial seed production, or for the production of timber or wood products, or for research purposes except for wide-area public pest control programs sponsored by government entities, such as mosquito abatement, gypsy moth control, and Mediterranean fruit fly eradication.

Do not apply this product through any type of irrigation system.

Foray 76B contains the spores and endotoxin crystals of *Bacillus thuringiensis kurstaki*. Foray 76B is a stomach poison and is effective against lepidopterous larvae. After ingestion, larvae stop feeding within hours and die 2-5 days later. Maximum activity is exhibited against early instar larvae. Apply Foray 76B by ground or aerial equipment.

CONTINUED

Shake or stir Foray 76B before use. Add some water to the mix tank, pour the specified amount of Foray 76B into the tank, and then add the remaining amount of water to obtain the proper mix ratio. Agitate as necessary to maintain the suspension. Do not allow diluted mixture to remain in the tank for more than 72 hours.

12.1 Ground Application

Use an adequate amount of tank mix to obtain thorough coverage without excessive run off. Use the indicated recommended per acre rates of Foray 76B in up to the following amounts of water:

High volume hydraulic sprayers	100 gallons
Mist blowers	10 gallons

12.2 Aerial Application

Apply Foray 76B, either alone or diluted with water, aerially at the rates shown in the application rates table. Spray volumes of 28-67.5 fluid ounces of product per acre give optimum coverage.

13.0 Table 2.

Crop	Pests	Rate ¹ (fl. oz./acre)
Forests, Shade Trees, Ornamentals, Shrubs, Sugar Maple Trees, Ornamental Fruit, Nut & Citrus Trees ²	Gypsy Moth ² Elm Spanworm	13.5 - 67.5
	Spruce Budworm Browntail Moth Douglas Fir Tussock Moth Coneworm Buck Moth	13.5 - 50.5
	Tussock Moth Pine Butterfly Bagworm Leafroller Tortrix Mimosa Webworm Tent Caterpillar Jackpine Budworm Blackheaded Budworm Saddled Prominent Saddleback Caterpillar Eastern & Western Hemlock Looper Orangestriped Oakworm Satin Moth	10.0 - 27.0
	Redhumped Caterpillar Spring & Fall Cankerworm California Oakworm Fall Webworm	7.0 - 13.5

Special Instructions

¹Use the higher recommended rates on advanced larval stages or under high density larval populations.

²In treating gypsy moth infested trees and shrubs in urban, rural, and semi-rural areas, exposure of non-target vegetation including, but not limited to, native and ornamental species and food or feed crops is permitted.

14.0 NOTICE OF WARRANTY

To the extent consistent with applicable law, seller makes no warranty, express or implied, of merchantability, fitness or otherwise concerning the use of this product other than as indicated on the label. User assumes all risk of use, storage or handling not in strict accordance with accompanying directions.

Foray is a registered trademark of Valent BioSciences Corporation.



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HERCON®
DISRUPT® II
GYPSY MOTH MATING DISRUPTANT

Population Suppressant

HERCON DISRUPT II® Gypsy Moth is a controlled-release pheromone formulation designed to lower incidence of gypsy moth, *Lymantria dispar*, mating by disrupting normal male flight orientation to females. This reduction in mating will help suppress the larval (caterpillar) population that causes damage by feeding on the leaves of hardwoods and evergreens.

ACTIVE INGREDIENTS:

(Z)-7,8-epoxy-2-methyloctadecane...	17.9 %*
OTHER INGREDIENTS	82.1 %
TOTAL	100.0 %

CONTENTS:

MINIMUM NET WEIGHT: KG[lb]*

* 8.5 kg [18.7 lb] of product will treat 50 acres at 30.4 g A.I./acre

KEEP OUT OF REACH OF CHILDREN
C A U T I O N

Read Directions and Precautionary Statements Before Use

FIRST AID:

Have the product container or label with you when calling a poison control center or doctor or going for treatment

IF SWALLOWED:

- Call a poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to by a poison control center or doctor.
- Do not give anything to an unconscious person.

IF IN EYES:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing.
- Call a poison control center or doctor immediately for treatment advice.

IF ON SKIN:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor immediately for treatment advice.

IF INHALED:

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.
- Call a poison control center or doctor immediately for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact the National Pesticide Telecommunications Network at 1-800-858-7378 for emergency medical treatment information. Hours of operation are seven days a week 6:30 am to 4:30 pm PST.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

CAUTION: Harmful if swallowed or absorbed through skin. Avoid contact with skin, eyes and mouth. Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco products or using the toilet. Applicators and other handlers must wear long-sleeved shirt and long pants, waterproof gloves and shoes plus socks.

ENVIRONMENTAL HAZARDS: For terrestrial uses: Do not apply directly to water or to areas where surface water is present nor to intertidal areas below the mean high water mark, except under forest canopy. Do not contaminate water when disposing of equipment washwaters or rinsate.

HERCON® DISRUPT II GYPSY MOTH

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Apply this product up to two weeks before adult gypsy moth emergence. Depending on the gypsy moth population densities apply 30 gm (170 gm (6 oz) of product), 15 gm (85 gm (3 oz) of product) or 6 gm (34 gm (1.2 oz) of product) of active ingredient per application per acre. Apply 15 gm and 6 gm of active ingredient in low density gypsy moth populations. Consult your state or local authorities for determining gypsy moth population levels in your area. **To ensure proper rate and method of application, make application by or under the supervision of qualified a person.**

Apply a second application if adult gypsy moth emergence is extended or delayed, otherwise one application lasts the entire season. Use an inert sticker material with DISRUPT II to hold flakes on treated foliage or plant parts. The Hercon applicator is specifically designed to mix the proper amount of DISRUPT II flakes and inert sticker at the time of application. Use in areas such as forest; residential, municipal and shade tree area, recreational area such as campgrounds, golf courses, parks and parkways; ornamental, shade tree plantings; shelter belts and rights of way and other easements.

STORAGE AND DISPOSAL:

Do not contaminate water, food, or feed by storage and disposal

PESICIDE STORAGE: Store in sealed containers in a cool dry place.

PESTICIDE DISPOSAL: Waste resulting from this product may be discarded in an approved landfill.

CONTAINER DISPOSAL: Do not reuse empty bags. Place empty bags in trash

WARRANTY AND DISCLAIMER STATEMENT

To the fullest extent permitted by law, Hercon Environmental warrants that this material conforms to the chemical description on the label. Manufacturer neither makes, nor authorizes any agent or representative to make any other warranty of fitness or of merchantability, guarantee or representation, expressed or implied concerning this material. Manufacturer's maximum liability for breach of this warranty shall not exceed the purchase price of this product. Buyer and user acknowledge and assume all risks and liabilities resulting from the handling, storage and use of this material not in conformance with the label.

Made in the USA by
HERCON ENVIRONMENTAL
Emigsville, PA 17318-0435

EPA Reg. No. 8730-55 EPA Est. No. 8730-PA-01

Questions? Call 1-866-4-HERCON

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Rev 10/06



For Mating Disruption of the
Gypsy Moth, *Lymantria dispar*

SPLAT (Specialized Pheromone and Lure Application Technology) is an amorphous polymer matrix for the sustained controlled release of insect pheromones. **SPLAT GM** provides control of the gypsy moth by disrupting mating behavior.



ACTIVE INGREDIENT:	
Disparlure, (Z)-7,8-Epoxy-2-methyloctadecane.....	13.00%
OTHER INGREDIENTS	87.00%
TOTAL	100.00%

KEEP OUT OF REACH OF CHILDREN
CAUTION

FIRST AID STATEMENT	
IF IN EYES:	<ul style="list-style-type: none">• Hold eye open and rinse slowly and gently with water for 15-20 minutes.• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.• Call poison control center or doctor for treatment advice.
IF ON SKIN OR CLOTHING:	<ul style="list-style-type: none">• Take off contaminated clothing.• Wash skin immediately with soap and water, then rinse with plenty of water for 15-20 minutes.
IF SWALLOWED:	<ul style="list-style-type: none">• Call poison control center or doctor immediately for treatment advice.• Have person sip a glass of water if able to swallow.• Do not induce vomiting unless told to do so by poison control center or doctor.• Do not give anything by mouth to an unconscious person.
National Pesticides Information Center: Have the product container or label with you when calling a poison control center, doctor, or going for treatment. For emergency information concerning this product, call the National Pesticides Information Center (NPIC) at 1-800-858-7378 seven days a week, 6:30 am to 4:30 pm Pacific Time (NPIC Web site: www.npic.orst.edu).	

See side/back panel for additional precautionary statements

Net Contents: _____ Lbs _____ Kg EPA Reg. No. 80286-4
Batch Number: _____ EPA Est. No. 80286-CA-004

PRECAUTIONARY STATEMENTS	
HAZARDS TO HUMANS AND DOMESTIC ANIMALS, CAUTION: Causes moderate eye irritation. Harmful if swallowed or absorbed through skin. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove contaminated clothing and wash before use.	
PERSONAL PROTECTIVE EQUIPMENT (PPE): Applicators and other handlers must wear long-sleeved shirt and long pants, waterproof gloves, and shoes plus socks. Follow the manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.	
ENVIRONMENTAL HAZARDS: For terrestrial uses: Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Incidental applications to water under the forest canopy are not considered to be a direct application to water, but should be avoided if practicable. Spray valves must be shut off when passing over surface water not under the canopy. Do not contaminate water when cleaning equipment or disposing of equipment washwaters or rinsate.	
DIRECTIONS FOR USE	
It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Always consult your pest control advisor, distributor or ISCA Technologies, Inc. for advice regarding the use of SPLAT GM.	
GENERAL	SPLAT GM uses the pheromone of the gypsy moth (<i>Lymantria dispar</i>), to disrupt a adult moth mating and thus reduce larval damage to trees.
TARGET PEST AREAS-WIDE CONTROL	Gypsy Moth (<i>Lymantria dispar</i>) This product is only for use in wide-area gypsy moth control programs sponsored by government entities. Areas of application include, but are not limited to: forests; residential, municipal, and shade tree areas; recreational areas such as campgrounds, golf courses, parks, and parkways; ornamental and shade trees; shelterbelts, rights-of-way; and other easements. Area-wide or wide-area application of SPLAT GM is most effective. The efficacy of any mating disruption strategy will be reduced by the influx of adults from surrounding areas. It is for this reason that mating disruption works increasingly well with larger acreages where the ratio of exposed borders to overall area treated is reduced. Always make application of SPLAT GM in consultation with your pest control advisor, distributor, or ISCA Technologies, Inc. No intentional food uses are permitted. However, an exemption from the requirement of a tolerance is established for residues of (Z)-7-8-epoxy-2-methyldecane (Disipaire) on all food and feed crops that occur when it is used to treat trees, shrubs, and pastures and such use results in unintentional spray and drift to non-target vegetation including non-food, food, and feed crops. Monitor for pests on a regular basis so that timely intervention with insecticides or alternative controls are possible. Use gypsy moth pheromone-baited monitoring traps made by ISCA Technologies or other suitable traps to monitor the presence of male moths, their emergence and their movement. Place monitoring traps before applying SPLAT GM to determine the infestation level. Continue monitoring throughout the season to evaluate efficacy and longevity of the pheromone application. Monitor treated plots for the target pest. Implement supplementary control measures if the pest population densities are above economic threshold levels.
APPLICATION TIMING	Apply SPLAT GM anytime in the two weeks preceding male flight and adult activity. Additional applications may be made if populations exceed the economic threshold. Consult your pest control advisor, distributor, or ISCA Technologies, Inc. for proper application timing.
APPLICATION CONDITIONS	Apply SPLAT GM when the ambient air temperature is above 50°F. SPLAT GM will cure within 3-4 hours following application, after which it will become rain fast and UV resistant. Do not apply if rain is expected within 1-2 hours of application or the temperature is outside of this range.
APPLICATION RATE	The application rate of SPLAT GM ranges from 23 grams to 230 grams of undiluted product per acre. This is equivalent to 3 grams to 30 grams of pheromone active ingredient (AI) per acre. Do not exceed 150 grams of AI per acre per year for multiple applications.
PREPARATION FOR USE	Always check SPLAT GM 24 hours before using. If SPLAT GM has been stored in a refrigerated area and has hardened, allow at least 48 hours at room temperature to achieve a workable consistency. Always mix SPLAT GM thoroughly before use; a drill

	with paint mixing paddle or similar device works best. Avoid mechanical mixing with sharp blades, which come into contact with the plastic container as this can introduce shards of plastic into the SPLAT GM formulation, which might interfere with product flowability and application.
APPLICATION EQUIPMENT	SPLAT GM is applied either aerially or by ground with conventional application systems pressurized either by centrifugal pumps or positive displacement pumps, pressurized gas cylinders, or a combination of both. The flow of SPLAT GM product can be controlled with agricultural-type solenoids. Calibrate applications based on volume output and application speed and swath area treated. Do not apply this product through any type of irrigation system. SPLAT GM can also be applied manually using other devices like a metered dosing gun. To ensure proper application, consult your pest control advisor, distributor, or ISCA Technologies, Inc.
POINT SOURCE SIZE, PLACEMENT, AND SPACING	For ground applications, SPLAT GM droplet size can be varied depending on pest population and duration of control desired. A dense infestation will require a higher density of point sources to achieve optimal mating disruption. With aerial applications, there is less control over the variation in droplet size and there will be a range from approximately 300 to 2000 microns in size. When SPLAT GM is sprayed on the tree canopy at 46 grams per acre (6 grams AI per acre), the range in droplet size will usually be 300 to 1000 microns. This will provide area-wide, season-long management of low-density populations. To ensure proper application, please consult your pest control advisor, distributor, or ISCA Technologies, Inc.
CLEANING EQUIPMENT	Clean equipment with water and citrus or limonene detergents.
STORAGE AND DISPOSAL	
PESTICIDE STORAGE	Do not contaminate water, food or feed by storage or disposal. Store product sealed and refrigerated, if possible. If refrigerated, do not store with food. If refrigeration is not available, store product in a cool dry place, out of direct sunlight. Do not exceed 75°F for long-term storage. Avoid freezing. In case of leak or spill, wipe with paper towel and dispose of waste when product hardens.
PESTICIDE DISPOSAL	Wastes resulting from the use of this product may be disposed of on site or at an approved waste facility.
CONTAINER DISPOSAL	Nonrefillable container. Do not refill or reuse this container. Triple rinse (or equivalent) promptly after emptying. Then offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities by burning, if burned, stayout of smoke.
WARRANTY AND LIMITATION OF DAMAGES	
Read all directions carefully. All statements concerning the use of this product apply only when used as directed. ISCA Technologies warrants that this material conforms to the specifications on the label and is reasonably fit for the intended purpose referred to on the label. To the extent consistent with applicable law, ISCA Technologies makes no other express or implied warranty of merchantability or fitness for a particular purpose or any other express or implied warranty.	

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